University of Alberta Library
0 1620 1670 0864

A32501

Digitized by the Internet Archive
in 2019 with funding from
University of Alberta Libraries

https://archive.org/details/bluejay483sask

BLUE JAY

September 1990

The Blue Jay, founded in 1942 by Isabel M. Priestly, is a journal of natural history conservation for Saskatchewan and adjacent regions. It is published quarterly b Saskatchewan Natural History Society, Box 4348, Regina, Saskatchewan. S4P 3 CN ISSN 0006-5099.

Editor: Sheila Lamont
Associate Editors: Margaret Belcher, J. Bernard Gollop, Wayne C. Harris, Ro Hooper, John H. Hudson, Bruce A. McCorquodale, Robert W. Nero, Carol A. Sc
Editorial Assistant: Carman Dodge

EDITORIAL INFORMATION: All items for publication should be addressed to editor at **Box 550, Raymore, Saskatchewan. S0A 3J0** Deadlines for each issue a months prior to issue, i.e. 1 January, 1 April, 1 July and 1 October. Typewr manuscripts should be double spaced and submitted in duplicate. Manuscripts be submitted in text file form on IBM compatible 5.25 inch DSDD diskettes, or inch (either in high or low density) which will be returned to authors when co have been made. Please include a hard copy. For further guidelines contact the ed Common names are used for species where possible. Bird names follow the 1 revision of the American Ornithologists' Union Check-list. Mammals are f Banfield's The Mammals of Canada (1974). Since insect and plant names are standardised, scientific names are included, with authorities where deemed necess Scientific names are also included for extralimital species, those not normally oc ring in North America.

Photographs submitted should be on glossy paper. Negatives or slides sent wil returned after prints have been made for SNHS files. Prints will be returned on requ Deadlines for photographic materials are 4 weeks prior to issue, i.e. 1 Februar May, 1 August and 1 November.

Any material printed for the first time in the Blue Jay may be reproduced wit permission. Credit lines will be appreciated. Use of photographs requires wr permission from the photographer.

ADVERTISING: Advertising rates may be obtained from SNHS, Box 4348, Reg Saskatchewan. S4P 3W6

REPRINTS: Requests for quantities of reprints of any article in the Blue Jay shoul made to the editor with the submission of an article. Contributors wishing a few copies of the current issue may get them at cost. Requests for these should be m to the editor when material is submitted for publication.

SUBSCRIPTION-MEMBERSHIPS: Send all renewals, new memberships, and respondence concerning changes of address to **SNHS, Box 4348 Regina, S atchewan. S4P 3W6**

The classes of membership in the Society are as follows: Regular $12.; Sustaining $ Patron $50.; Junior $8. and Senior Citizen $10. Sustaining and Patron members include the regular fee plus a donation for which a receipt is available, upon requ for income tax purposes. Bulk orders (minimum of 5 to one address) are availab club members and educational institutions at the rate of $12. for the first subscrip and $10. for each additional one. Life memberships are $500. Outside Canada are $15.

Cover: *Piping Plover. Cavendish Sandspit, P.E.I. Winifred Wake*

MEMBERSHIP RENEWAL AND GIFT FORM

me (please print) ....

dress ....

....

/Town .... Prov. ...... Postal Code ....

e of Membership (please check)

ular -- Canada ($12) .... [] Regular -- outside Canada ($15) .... []

ior -- Canada ($8) .... [] Senior Citizen -- Canada ($10) .... []

taining ($25) .... [] An income tax receipt for Sustaining,

on ($50) .... [] Patron, Life Memberships and Donations

($500) .... [] will be sent if you check here ..... []

a new member for 199______ This is a renewal for 199______

sh to make a donation to: Conservation Fund $ .... []

Heritage Marshes Fund $ .... []

.... Other $ .... []

heck above if receipt is required.

e Membership is payable at one time or over 5 years, or any shorter period agreed.

ny amount over $10.00 in excess of the regular membership of $12.00 is viewed **donation** for income tax purposes and a receipt for the excess amount will be ed if the appropriate box is checked above.

ulk subscriptions to schools and clubs is $12.00 for the first subscription and 00 for each additional subscription to the same address (minimum of 5 subscrip-).

Please send **Blue Jay Gift Subscription** to:

e ....

ess ....

Town .... Prov. ...... Postal Code ....

eck here if you wish us to send a card announcing the gift.

of Gift Membership (Please check)

lar -- Canada ($12) .... [] Junior -- Canada ($8) .... []

lar -- outside Canada ($15) .. [] Senior Citizen -- Canada ($10) .... []

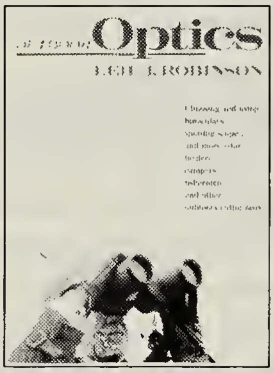
d renewal form to **SNHS**

Box 4348
Regina, Saskatchewan
S4P 3W6

cheques and money orders payable to **Saskatchewan Natural History Society**

o you know of any person interested in natural history and conservation who not receive the *Blue Jay*? Please send their name and address and we will send ple *Blue Jay* and an invitation to join our Society.

ADVERTISING



Outdoor Optics

Leif J. Robinson

A concise and practical layman's handbook for the purchase, use, and care of all types of binoculars and spotting scopes.

$16.95 paperback

A Prairie Guide to Feeding Winter Bird

Bob Waldon

A complementary, entertaining reference to major guides, a welcome addition to any bird-lover's reference shelf.

45 black & white drawings
$15.95 paperback

Available at Bookstores Everywhere

Western Producer Prairie Books
Saskatoon, Saskatchewan

THIS ORGANIZATION RECEIVES FUNDING FROM

Saskatchewan LOTTERIES

BLUE JAY

l. 48 No. 3 September 1990 125-170

SKATCHEWAN BIRD BANDERS — R. LORNE SCOTT.
Stuart Houston and *Mary I. Houston* 126

nts

INVASION OF THE CANADIAN PRAIRIES BY AN EXOTIC
PERENNIAL. *J.T. Romo, P.L. Grilz* and *E.A. Driver* 130

ects

CHECK-LIST OF SASKATCHEWAN MOTHS , PART 6:
LOOPER MOTHS (PLUSIINAE). *Ronald Hooper* 136

ds

PIPING PLOVER RESEARCH AND CONSERVATION IN CANADA.
J. Paul Goossen 139

OLIVACEOUS CORMORANT — FIRST RECORD FOR CANADA.
Frank Brazier 154

NAPPROPRIATE ESCAPE BEHAVIOUR OF CANADA GEESE WITH
YOUNG. *E. Otto Hohn* 156

UNUSUAL CONCENTRATIONS OF SANDHILL CRANES DURING
THE BREEDING SEASON. *W.H. Koonz* 157

ROSS' GULL NEAR SASKATOON, SASKATCHEWAN.
im Wedgwood 158

PREDATION AT BANK SWALLOW COLONIES NEAR KATEPWA
AKE. *Dale G. Hjertaas* and *Paule Hjertaas* 162

MOCKINGBIRD NEAR SYLVAN LAKE, ALBERTA.
Helge S. Abrahamson 166

URTHER TO WHITE-EYED VIREO OBSERVATIONS.
anet Rogge Dugle 166

HOUSE FINCH AT REGINA, SASKATCHEWAN. *Keith Barr* 167

MEMORIAM — DR. FREDERICK GEORGE BARD — 1908 - 1989.
y Apperley and *Fred Lahrman* 168

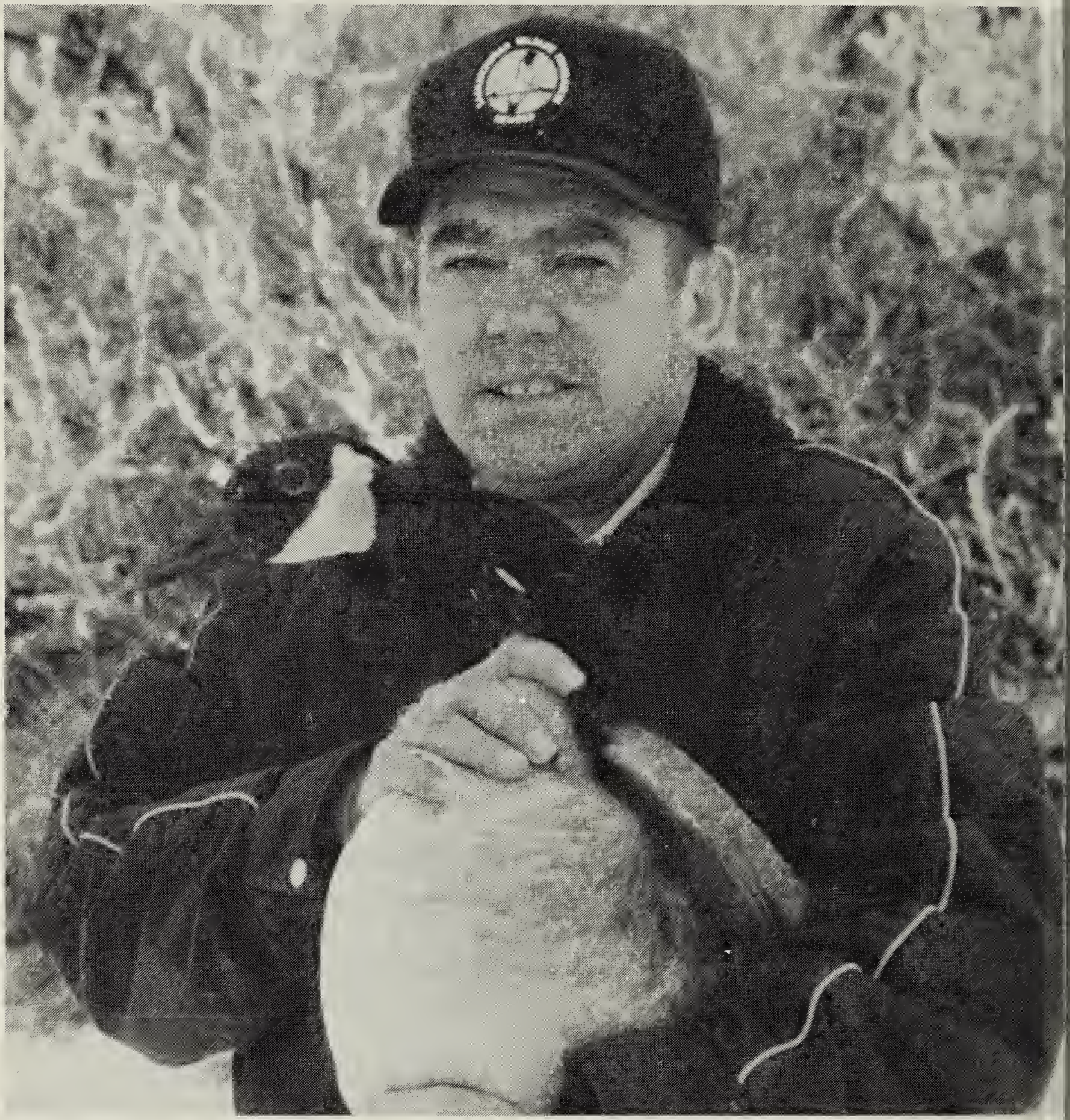
ces

CHRISTMAS BIRD AND MAMMAL COUNTS - Announcement 138

NFORMATION REQUEST -- SAPSUCKER vs HUMMINGBIRD 161

SASKATCHEWAN BIRD BANDER
R. LORNE SCOTT*

C. STUART HOUSTON and MARY I. HOUSTON, 863 University Drive, Saskat ,
Saskatchewan. S7N 0J8



Lorne Scott received banding permit #10242 in 1969, and since then has banded 24,559 individual birds of 43 species in 21 years. Over half of his banding, 11,656 Tree Swallows and 6,339 Mountain Bluebirds, has resulted from the 2000 bird houses he has built aro d Indian Head and on his portion of e Prairie Bluebird Trail, between Raym e and Broadview. His peak year for M - tain Bluebirds was 1974 when he ban d 900. His peak year for Tree Swallows s

---

* Number 15 in a series of biographies of Saskatchewan bird banders

75 when he banded 2299 of his year's
and total of exactly 4000 birds. He has
o banded 50 Eastern Bluebirds, includ-
15 in 1973. From 1969 through 1975,
between seeding and haying seasons,
rne was accompanied by Gary Seib in
wn-to-dark "blitzes" of 2000 houses
ng over 500 miles of highways and
ckroads, stopping about three times
h mile. The overall trail extends from
nholm, Saskatchewan to Winnipeg,
nitoba and to the best of our
owledge is the longest trail, in terms of
tance between extremities, of any such
l in the world.

orne has banded a substantial number
waterfowl at the Wascana Centre in
gina, including 1407 Canada Geese,
7 Mallards, 111 Blue-winged Teal and
Lesser Scaup. The only colonial birds
nded are Common Terns, with 180
nded on an island in Wascana Lake,
he has banded 875 Yellow-headed
ckbirds nesting in bulrushes at Was-
a Marsh. He banded 3 immature
ng Plovers at Chaplin Marsh in 1987.

time-consuming activity has involved
banding of 379 Great Horned Owl,
Burrowing Owl, 191 Red-tailed
k and 29 Swainson's Hawk nestlings,
301 nestling Black-billed Magpies.
e's peak year for Red-tailed Hawks
1969 with 86 nestlings banded, for
at Horned Owls, 1970 with 99 nest-
banded, and for Burrowing Owls,
with 82 banded.

rne has had 441 recoveries to date,
counting "returns" of bluebirds and
swallows to nest boxes in subsequent
s. The list of recoveries is led by 227
ada Geese and 167 Mallards, fol-
ed by three each of Green-winged
and Black-billed Magpie, two each
ue-winged Teal and Common Tern,
ne each of Lesser Scaup, Swainson's
k, Cedar Waxwing and Yellow-
ed Blackbird.

Common Terns travelled to Ponta de Mita, Nayarit, Mexico by 5 January and to Puerto San Jose, Guatemala, by 10 January, just over six months after each was banded.

Since large numbers of Canada Geese wintered on Wascana Lake when the power plant maintained open water and a somewhat smaller number still winter in the snow, the southward travels of the Wascana geese seem all the more remarkable. Lorne has had 75 goose recoveries from Nebraska, 47 from South Dakota, 15 from Kansas and 9 from Colorado, plus two each from Alberta, Minnesota, North Dakota, Texas and Wyoming and one each from Kentucky, Missouri and Oklahoma. Of interest are the geese whose bands were read from a distance by telescope: one each in Kansas, Minnesota and South Dakota, and one whose band was read twice in Nebraska in the same winter. Two geese were trapped in Nebraska during operations by a state banding crew, and four were retrapped during later banding operations on the Wascana Marsh at Regina.

Mallards from the Regina Waterfowl Park have dispersed even more widely, with recoveries in decreasing frequency from Arkansas (24), Louisiana (14), Nebraska (13), Kansas (9), Mississippi (9), North Dakota (7), Iowa (6), Missouri (6), Oklahoma (4), Kentucky (3). Two each went to Alberta, Manitoba, Colorado, Idaho and Tennessee, and one each to Nevada (!), South Dakota, Texas, and Wisconsin. A Lesser Scaup and a Blue-winged Teal were shot in Louisiana, another Blue-winged Teal in Iowa, and Green-winged Teal in Louisiana, Texas and Sinaloa, Mexico.

Among 22 Great Horned Owl and 7 Red-tailed Hawk recoveries are two remarkable longevity records. A Great Horned Owl, 518-60849, banded near Maryfield, 49° 40′ North, 101° 20′West, on 17 May 1970 was found weak and soon died in Mrs. Tom Naylen's yard at 49° 30′North, 101° 50′ West (near Redvers in southeastern Saskatchewan), in October 1988. This is one of the six oldest owls in the North American banding recovery files at last report. A Red-tailed Hawk, 697-55321, banded north of Balcarres on 28 June 1969 was found dead on a highway 9 miles south of Quinton, Saskatchewan, on 2 September 1989. It was 20 years, 2 months old. Until 1983 the Redtail record had been 19 years, 9 months, but then an Iowa-banded hawk was recovered in the same state when at least 21 years, 6 months old.

The greatest distances travelled by owls were to Iowa: one banded south of Lebret was recovered that November at Pickerel Lake, Iowa, and one banded 7 miles west of Duval was found dead the next May in Calhoun County, Iowa. Other owls went to Manitoba, North Dakota and South Dakota. Redtails banded near Gibbs were found injured at Altoona, Kansas, shot at Fredonia, Kansas, and found dead west of Fort Dodge, Iowa, the following winter. Another Redtail from Neudorf was found dead near Enid, Oklahoma, 18 months later.

Three Black-billed Magpie recoveries have been near the place of banding. A Yellow-headed Blackbird was shot at Fresnillo, Zacatecas, Mexico within two months after it was banded. A nestling Cedar Waxwing, banded south of Indian Head on 10 July 1977, was caught by a cat at Atikokan, Ontario, 885 km to the east, on 28 August of the same year.

Extensive banding of bluebirds and tree swallows has failed to provide recoveries from the wintering grounds of these two species, but a Tree Swallow was found dead in fall migration in North Dakota and another was recovered from Minnesota. One Mountain Bluebird was found dead in North Dakota during spring migration of the year following banding.

Lorne grew up on the family m southeast of Indian Head, attended a e-room country school, and graduated m the Indian Head high school in 196 le worked at the Saskatchewan Museu of Natural History from 1 May 1967 thr gh November 1975, guiding tours, wo g on children's programs, setting up th st nature trails in several provincial p s, and doing research and display w k. Lorne next accepted a position as th st full-time Park Naturalist for Was a Centre Authority in Regina, wher e remains employed, commuting eac ay from his 800-acre farm. Here he m n-tains 200 acres of poplar copses (c ed "bluffs" in Saskatchewan) and sloug as formally protected wildlife habitat u er the SWF's "Acres for Wildlife" pro n, providing food and shelter for many r and mammal species.

Lorne has received many presti us awards, including:

> Annual Conservation Award o he Saskatchewan Natural History So ety (1969); Honorary Life Membersh i Whooping Crane Conservation s sociation (1974); Canadian ri Award as an outstanding young ci e (1978); Gordon Lund Memorial n servation Award from Saskatch a Wildlife Federation (SWF) (1981) rs recipient of the Governor Gen l Conservation Award sponsored b h Tourism Industry Association of Ca d (1980); Conservation Service A from Ducks Unlimited Canada (1 2 John and Norah Lane Conserv o Award from the North Ame a Bluebird Society (1983); B.M. M son Award from the Saskatchewan u door and Environmental Educ o Association (1987); Honour A from Whooping Crane Conserv o Association (1987); Roland Mic e Conservation Award from Can a Wildlife Federation (1989); Do la Pimlott Award from Canadian N Federation (1990).

orne was a member of the board of the
katchewan Natural History Society,
68-1979, first as Youth Program Direc-
, then President of the SNHS, 1980-82,
nching money-raising for the SNHS
nservation Fund and in participation
h the SWF, launching the Heritage
rsh Program, 5 November 1981. He
ved on the Board of Directors of the
rth American Bluebird Society, 1980-
1. He became active with the Sask-
hewan Wildlife Federation, serving as
ir Provincial Habitat Chairman, 1982-
5 and 1988-89 and as its President,
6-1987, the only person ever to be
sident of both the provincial
uralists' and sportsmens' organization
askatchewan. He was President of the
ooping Crane Conservation Associa-
, as well as coordinator of the WCCA
adian Council since it was formed in
2. He was director of the Canadian
ure Federtion, 1985-1986, director of
the Canadian Wildlife Federation, 1986-89 and on the World Wildlife Fund's Wild West Steering Committee which focussed on Prairie Endangered Species, 1986-88.

From 1972 through 1976 Lorne was contributing editor to the monthly *Purple Martin News*, published in Griggsville, Illinois. He has contributed articles to *Blue Jay* and *Beaver*, written for the Canadian Wildlife Service's *Hinterlands Who's Who*, and contributed photographs to *Blue Jay, Defenders of Wildlife, National Geographic*, and *Nature Canada*. He has been interviewed on "Canada A.M.", and has spoken to naturalists groups in Saskatchewan, Alberta and Manitoba and to the annual banquets of the North American Bluebird Society and Ducks Unlimited (Canada). Bird banding has been only one facet of the activities of this farmer-naturalist.

ne Scott leading a nature tour at Condie Nature Reserve *Gary W. Seib*

INVASION OF THE CANADIAN PRAIRIES BY AN EXOTIC PERENNIA

J.T. ROMO and P.L. GRILZ, Department of Crop Science and Plant Ecol ,
University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0 and E.A. DRIV ,
Canadian Wildlife Service, 115 Perimeter Road, Saskatoon, Saskatchewan. S7N 4

Introduction

Since settlement of the Canadian Prairies the grasslands have been influenced by a variety of agricultural practices.[18] These practices and their impact, such as tillage and growing annual crops, have completely obliterated the grasslands. Another activity that has generated much interest and has modified the prairie is imprudent grazing management. While these activities have drawn considerable attention from conservationists, an equally important event which has received less attention s been the purposeful introduction of x-otic plants such as Alfalfa (*Medic o sativa*), Crested Wheatgrass (*Agrogy n cristatum*), Russian Wild Rye (*Psathy s-tachys juncea*) and Smooth Br e (*Bromus inermis*) into the prairie eco s-tem, primarily for the purpose of fo e production.

To the uninformed or unconcerned e introduction of exotic species into e ecological integrity of the prairie eco s-

Old school north of Maryfield, Saskatchewan. Abandoned building sites often e vegetated with Smooth Brome, which moves outwards from these sites.

B. de V s

ms is viewed as harmless unless they
se a threat to crops. However, to con-
rvationists these introductions should
gnal the potential for further destruction
native flora and, they also signal an
known threat to the ecosystem. Unfor-
nately many students of the natural
airie have been concerned with the
rger and more obvious issues, cultiva-
n and grazing, not to grassland disap-
arance because of seeding and the
itive expansion of exotic species.

How long and in what ways these ex-
c plants express their potential and im-
ct on the ecosystem over their new
nge is not elucidated by short-term
aluations. Their dispersal, estab-
ment, and domination of native flora
n be an insidious process that for all
ctical purposes permanently trans-
ms native vegetation into plant com-
unities dominated by exotics. In
ticular, many vegetation complexes
becoming dominated by Smooth
me.

e introduction and use of Smooth me

he exact date when Smooth Brome
s introduced to Canada is not known,
it appeared sometime between 1875
1888.[1,5] Immigrants from Europe may
e brought some of the grass with them
which there will be no record. Regard-
of the date of introduction and its
in, by 1896 scientists with the
minion Department of Agriculture
gnized Smooth Brome as a useful
s for revegetating native grasslands
had become "exhausted;" by 1930 its
erior adaptability and performance
recognized.[7] It became widely used
hay and pasture, frequently escaping
ivation to form a common grass cover
roadsides, railway rights-of-way,
ndoned lands, and other disturbed
s.[10] Since its introduction in the late
0s Smooth Brome has been widely
ibuted throughout Canada.

This long-lived perennial is adapted to a variety of soils, growing best on those that are fertile and well-drained.[16] Smooth Brome is valued for grazing and hay and it is the most important introduced forage in the central and northern parts of the Prairie Provinces.[11] This distribution corresponds with the Aspen Parkland and the southern edge of the Boreal Forest. In the Mixed Prairie Smooth Brome is best adapted to sites that are cooler and moister than the general environment. It is also grown under irrigation.

Ecological relations of Smooth Brome with native flora and fauna

Once Smooth Brome establishes, it effectively suppresses the growth of other species. Research on a protected Fescue Prairie in Saskatchewan identified that the richness of native species declined to a point where native species were almost non-existent on sites where Smooth Brome had invaded (Grilz, unpubl. data). Where exotic species were dominant in Mixed Prairie in Manitoba, the cover and diversity of native species was reduced.[22] Wilson concluded that introduced species can competitively exclude native grasses, with Smooth Brome being one of the most dominating introductions.[23] Looman also noted a decline in floristic composition on sites where Smooth Brome had invaded.[11]

Not only is this demise and domination of native species occurring, but the adulteration of native germplasm is also a concern. There is evidence that Smooth Brome is crossing and intergrading with Northern Awnless Brome (*Bromus pumpellianus*), a native perennial (V. Harms, pers. comm.). What long-term impact this will have is unknown.

Associated with the increases in Smooth Brome in native prairie is a decline in use of the grassland by many species of wildlife (Driver, unpubl. data). At Last Mountain Lake Wildlife Refuge Driver found that as the age of Smooth

Brome-dominated grasslands increased the use by birds declined from eight to ten species to primarily two species — Savannah Sparrow and Clay-colored Sparrow. Wilson and Belcher concluded that exotic vegetation influences bird communities by causing a change in the species composition with some bird species increasing while others decline.[22]

Dispersal Ecology of Smooth Brome

The most obvious threat by Smooth Brome to native grassland ecosystems is the cultivation and seeding of this exotic on prairie that has been degraded by improper grazing. Other threats are subtle, but perhaps more important is the spatial distribution of this species.

In the early evaluations of this grass, Fletcher stated that Smooth Brome had one disadvantage — "a habit of growing like quackgrass" (presumably *Agropyron repens*).[5] We can only speculate exactly what was meant by this statement, but it is assumed he meant that Smooth Brome possessed an aggressive and spreading habit. Smooth Brome is one of the best grasses for erosion control, thus it is often seeded on sites disturbed in road construction, and oil, gas and mineral development.[21] These many seedings act as small foci that can collectively occupy nearby areas faster than one large introduction such as seeded pastures.[6, 9] Hume and Archibold's data show that seeds of Smooth Brome were transported at least 7 m from the edges of seeded pastures.[9] Provided a suitable habitat is present in adjacent vegetation, many sites are subject to invasion because of prolific seed production. Once established Smooth Brome spreads rapidly by rhizomes and seeds. Thus, the well-intentioned effort of stabilizing sites by revegetating them with Smooth Brome is actually accelerating the spread of this species.

The major issue that must be reckoned with is the planting of Smooth Brome in the vicinity of grasslands that are susceptible to invasion. How it moves into through the prairie does not appea lated to a specific vector, but rather host of dispersal mechanisms.

Looman concluded that Smooth Br does well in the Fescue grasslan Canada, invading sites that are graze otherwise disturbed.[11] However, Fe Prairie which is protected form grazin domestic livestock is not exempt f invasion by Smooth Brome. Data fro relict Fescue Prairie near Saskat shows that Smooth Brome was the most common of 16 graminoids. Sim ly, Blood reported that Smooth Br was the fifth highest producing grami in Fescue Prairie in Riding Mountain tional Park.[2] In relative terms both of t tracts of Fescue Prairie were undistur We have also observed brome inva many relict areas of Fescue Prairie.

The grasslands of the Mixed Pr region in southern portions of the Pr Provinces appear resistant to invasio Smooth Brome. However sites with b soil and moisture conditions, inclu riparian zones and wooded draws, being invaded by brome.

Native grasslands that are protected viewed by many naturalists as being disturbed, however, this attitud tempered by the definition of disturba and its scale. Large accumulation dead plant material tend to reduce vigour and density of the grasses, crea sites amenable to establishment of o species. Ways of preventing this cumulation include its removal by g ing or mowing and the use of prescri burning.[4] Hulbert concluded that w fire is used regularly Smooth Brome is in native grassland except where na grasses have been weakened or are sent following disturbance.[8]

Protected native grasslands may harbour high populations of mamm and their activities such as burrowing

rbivory can create significant distur-
nce on a localized scale that is not
vious. Larger disturbances are also
used by burrowing animals such as Red
x and Badger. We have observed Thir-
en-lined Ground Squirrels caching in-
rescences of Smooth Brome near their
rrows. This caching, combined with
disturbance of burrowing creates a
tential site for establishment.

Ve have a poor understanding of the
portance of this species in the diets of
ds. For a similar species, Cheatgrass
ome (*Bromus tectorum*), a small per-
ntage of the seeds ingested can pass
harmed through the digestive tract of
ds.[19] Perhaps another important means
lispersal is the fact that often this grass
ayed after seeds have been formed.
nen this hay is consumed by domestic
estock and native ungulates some
ds may pass through the digestive tract
a germinable condition and be dis-
sed over the landscape.

mooth Brome has a prolonged period
eed dispersal, with seeds being dis-
sed from maturation in mid-summer
ughout the winter (V. Harms, W.P.
ser Herbarium, University of Sas-
chewan). Since seedheads are often
vated above the snow, seeds may be
wn from established plants across
w pack, lodging at other sites in the
w. It is a matter of chance as to
ether the site of seed deposition
vides a suitable safe site for its ger-
ation and establishment.

nooth Brome is often planted along
ams because of the high potential for
ge production on these sites. Since
ls and seedlings of Smooth Brome can
tolerate prolonged periods of flood-
the seeds can be transported
nstream and deposited over a wide
.[14] The movement of seeds by water
ese situations is extremely important
ts long distance dispersal along
rian zones, although the other transport mechanisms are probably also operating.

Why is Smooth Brome successful?

This question can not be answered with certainty, but from a theoretical standpoint the following arguments can be put forth. This grass has been selected by forage breeders for superior establishment, growth, persistence, and prolific seed production over a wide range of conditions. The germination and the growth of seedlings are also far superior to many native species.[20] When established brome forms a dense root system in the upper soil profile.[13] The purposeful selection for the prevailing environmental conditions of the Canadian Prairies and natural selection processes have produced an extremely well-adapted species that has become naturalized. These characteristics, combined with the fact that there are few if any natural predators, are enabling the grass to spread unchecked.

What does the future hold?

Through the history of settlement on the Canadian Prairies there has been an attitude of attempting to remedy the symptoms of poor land management rather than addressing the cause(s). One of these ill-founded solutions has been the introduction of exotic plants. Smooth Brome was examined as a potential forage because production of native grasses was apparently declining.[7] Little or no attempt was made to determine why it was declining. This attitude was, and still is, bolstered by the thought that technology or new technologies will permanently solve resource management problems.[3]

Conservationists have the opportunity to learn from the mistakes made by treating symptoms of poor resource management rather than identifying and treating the cause of the problems. The invasion and domination by Smooth Brome of natural ecosystems, a serious resource management problem, must be addressed and solved before the natural heritage of the Canadian Prairies is lost. This issue will continue to worsen because of natural selection pressures and the release of new and improved varieties.

Today we do not know for certain what the longterm consequences of introducing Smooth Brome might be. Only time will elucidate the implications of introducing this species to native plant communities. However, by examining the impacts of this plant on a local scale we feel confident of some predictions.

It is our opinion that a passive or hands-off approach to managing natural areas will eventually result in invasion by this exotic. Vegetation types that appear most prone to invasion by Smooth Brome are Boreal Forest, Aspen Parkland, Fescue Prairie and specialized habitats occupied by woody species in the Mixed Prairie. These vegetation types provide habitats that are similar to the "steppe meadows," shrubbery and openings that Smooth Brome occupies in Eurasia.[12] Conservation management plans must be developed that place managers in a proactive position rather than one in which they react to invasions. The consequences of invasions by Smooth Brome will become more severe the longer the development of plans is delayed.

Conclusions

The future of many native plant communities on the Canadian Prairies is bleak because of the combined influence of ploughing native grasslands and the introduction of Smooth Brome. As more land comes under cultivation and the native grasslands become more fragmented, the ratio of the disturbed land to undisturbed prairie increases. This increase in the relative amount of disturbed land will accelerate the rate of spread of exotic species.

Conservationists are now faced wit n enormous task if they wish to preserve e integrity of native flora. Our na e grassland ecosystems are threatened a land use philosophy and a species it was introduced without considering e long-term impact on the ecosyst n. Should we accept Smooth Brome as rt of the native flora and let this species n its natural course? How much and wh e is this species acceptable? These qu tions can be answered only a r landscape management goals are es lished.

We should prevent invasions d where invasions have already occur , the species must be controlled in the liest stages of development. In ot r words, strategies should be develope protect the unaffected or least affec d grasslands first. Until this is complete e must direct our management activi s toward eliminating satellite populatio . This will require that we expand our derstanding of ecological relationship f Smooth Brome in native communitie

[1] BEST, K., J. LOOMAN and J CAMPBELL. 1971. Prairie gras s identified and described by vegeta e characters. Agric. Canada Publ. 1413. tawa.

[2] BLOOD, D.A. 1966. The *Fest* *scabrella* Association in Riding Moun National Park, Manitoba. *Can. Field-Na* 80:24-32.

[3] CROSSON, P.R. and N.J. ROSENBE 1989 Strategies for agriculture. *Scie* *Amer.* 261:128-135.

[4] DRIVER, E.A. 1987 Fire n grasslands — friend or foe? *Blue* 45:217-225.

[5] FLETCHER, J. 1893 A valua e European grass. Canada House of C mons Report of the Select Standing C mittee on agriculture and colonizatio 32.

HARPER, J.L. 1977. Population biol- gy of plants. Academic Press, N.Y.

HEINRICHS, D.H. 1969. Forage rops research, past, present and future. *In* IELSON, K.F., Ed. Proc. of the anadian Forage Crops Symposium. pp 3-67. Modern Press, Saskatoon.

HULBERT, L.C. 1986. Fire effects on allgrass prairie. *In* CLAMBEY, G.K. and .H. PEMBLE, Eds. Proc. of the ninth orth American prairie conference. pp 138- 42. Tri-college University Center for En- ronmental Studies, North Dakota State niv., Fargo.

HUME,L. and W. ARCHIBOLD. 1986. e influence of weedy plant habitat on the ed bank of an adjacent cultivated field. *an.J. Bot.* 64:1879-1883.

NOWLES, R.P. and W.J. WHITE. 1949. e performance of southern strains of ome grass in western Canada. *Sci. Agric.* :437-450.

OOMAN, J. 1969. The fescue asslands of western Canada. *Vegetatio* :128-145.

OOMAN, J. 1983. Productivity of per- anent bromegrass pastures in the rklands of the Prairie Provinces. *Can. J. ant Sci.* 56:829-835.

OOMAN,J. 1983. 111 range and age plants of the Canadian prairies. ric. Canada Publ. 1751. Ottawa.

KENZIE, R.E. 1951. The ability of age plants to survive early spring flood- . *Sci. Agric.* 31:358-367.

ODY, M.E. and R.N. MACK. 1988. ntrolling the spread of plant invasions: importance of nascent foci. *J. Appl. ology* 25:1009-1021.

EWELL, L.C. 1973. Smooth megrass. *In* Forages: the science of ssland agriculture. pp 254-262. Iowa te Univ. Press, Ames.

[17] PYLYPEC, B. 1986. The Kernen Prairie — a relict fescue grassland near Saskatoon, Saskatchewan. *Blue Jay* 44:222-231.

[18] ROWE, J.S. 1987. One hundred years of land use. *Blue Jay* 45:127-139.

[19] SAVAGE, D.E., J.A. YOUNG and R.A. EVANS. 1969 Utilization of medusahead and downy brome caryopses by chukar partridges. *J. Wildl. Mgmt.* 33:975-978.

[20] SMOLIAK, S. and A. JOHNSTON. 1968. Germination and early root growth of grasses at four root-zone temperatures. *Can. J. Plant Sci.* 48:119-127.

[21] WALTON, P.D. 1983. Production and management of cultivated forages. Reston Publ. Reston, Virginia.

[22] WILSON, S.D. and J.W. BELCHER. 1989. Plant and bird communities of native prairie and introduced Eurasian vegetation in Manitoba, Canada. *Cons. Biol.* 3:39-44.

[23] WILSON, S.D. 1989. The suppression of native prairie by alien species introduced for revegetation. *Landscape Urban Plann.* 17:113-119.

EDITOR'S NOTE:

The problem with Smooth Brome is that its natural insect, nematode, and fungous pests haven't come over with it from Europe. And this raises a taxonomic question in my mind: If *Bromus inermis* is akin enough to *B. pumpellianus* to cross with it, why can't the parasites and predators which *B. pumpellianus,* as a native species, undoubtedly bears as a burden, attack *B. inermis*? I haven't observed any such disease or insect attack in nature; therefore my guess is that the two species are distinct, contrary to the views given by some authors. — *J.H. Hudson*

CHECK-LIST OF SASKATCHEWAN MOTH

PART 6: LOOPER MOTHS (PLUSIINAE)

RONALD HOOPER, Box 757 Fort Qu'Appelle, Saskatchewan. S0G 2P0

The caterpillars of this sub-family are called loopers because they loop their backs similar to Geometrid Moths when they are crawling because they lack legs on the third and fourth abdominal segments.

The adults are medium sized moths. The fore-wings are grey or brown and often there is a silver mark in the middle. Sometimes this mark is shaped like an "o" or a "u" or a "y," causing the name "*Autographa*" to be given to one of the genera. The hind wings are usually pale brown, buff, or orange, with broad dark bands near the outer margin.

Many of the species are avid flower feeders in the daytime. Some of the forest species prefer aster blossoms.

Abbreviations used in the text for directions are s = south, n = north, w = west, e = east; CNC = the only known Saskatchewan records of this species are in the Canadian National Collection in Ottawa. (All species are represented in the Saskatchewan Museum of Natural History collection in Regina unless otherwise stated).

Variegated Brindle - *Abrostola urentis* Gn. - s Saskatchewan, n to Aylsham.

Cabbage Looper - *Trichoplusia ni* (Hbn.) - s Saskatchewan, n to Aylsham.

Brassy Plusia - *Diachrysia aeroides* (Grt.) - s Saskatchewan, n to Red Earth, Aylsham, and Anglin Lake.

Large Brassy Plusia - *D. balluca* Gey. - Bjorkdale, Tantallon, Indian Head and Regina.

Unspotted Looper Moth - *Allagrap* *aerea* (Hbn.) - Reported for Chap area by Eichlin and Cunningham.

Straight-lined Looper Moth - *Pseud* *purpurigera* (Wlk.) - s Saskatchewan to Somme.

European Looper - *Polychrysia mor* *trabea* (Sm.) - Regina; also reported the Meadow Lake area by Eichlin Cunningham.

Formosa Looper Moth - *Chrysanymp* *formosa* (Grt.) - Little Bear Lake, Jay Lake (near Big Sandy Lake), La Ron Otter Rapids and Gordon Lake (n Pinehouse).

Pink-tinted Beauty - *Eosphoropte* *thyatyroides* (Gn.) - Fort Qu'App and Aylsham.

Bilobed Looper Moth - *Autograp* *biloba* (Steph.) - Bjorkdale and S katoon.

Common Looper Moth - *A. precati* (Gn.) - Earl Grey

Rubida Looper Moth - *A. rubida* Otto Cypress Hills and Saskatoon.

Twin Gold Spot - *A. bimaculata* (Steph s Saskatchewan, n to La Ronge.

Wavy Chestnut Y - *A. mappa* (G. and - Kamsack, Somme, Aylsham, Candle Lake.

Delicate Silver Y - *A. pseudogamma* (- Cypress Hills (CNC).

alfa Looper K.N. Roney

alfa Looper - *A. californica* (Spey.) - hroughout Saskatchewan, except ortheast corner.

er Whip - *A. flagellum* (Wlk.) - Nor- uay, Somme, Shoal Lake, Aylsham nd Saskatoon.

ken-banded Y - *A. ampla* (Wlk.) - s skatchewan, n to Aylsham.

ery Looper - *Anagrapha falcifera* by.) - s Saskatchewan, n to Aylsham d Meadow Lake Park.

ky Silver Y - *Syngrapha octoscripta* rt.) - n Saskatchewan, s to Mortlach.

row Silver Y - *S. epigaea* (Grt.) - Shoal ke and Saskatoon.

n-marked Looper - *S. viridisigma* rt.) - Throughout Saskatchewan.

ema Looper - *S. diasema* (Bdv.) - La che.

r U Looper - *S. u-aureum* (Gn.) - ntreal Lake area and Athabasca nds area (reported by Eichlin and nningham).

Question Mark Looper - *S. interrogationis* (L.) - Black Lake, Umpherville River (near Wollaston Lake) and Key Lake.

Surena Looper - *S. surena* (Grt.) - Midwest Lake (west of Wollaston Lake).

Hooked Silver Y - *S. alias* (Ottol.) - n Saskatchewan, s to Saskatoon.

Mountain Looper - *S. montana* (Pack.) - Harlan (CNC).

Small Gamma Looper - *S. microgamma* (Hbn.) - Weekes.

Alticola Looper - *S. devergens alticola* (Wlk.) - reported for Cluff Lake area by Eichlin and Cunningham.

Mountain Beauty - *S. ignea* (Grt.) - Cypress Hills, Porcupine Hills, Aylsham and Hunt Falls.

Putnam's Looper Moth - *Plusia putnami* Grt. - s Saskatchewan, n to Aylsham and Buffalo Narrows.

Connected Looper Moth - *P. contexta* Grt. - Fort Qu'Appelle and Saskatoon.

White-streaked Looper Moth - *P. venusta* Wlk. - s Saskatchewan, n to Aylsham and Loon Lake.

Expected Species

OU Looper Moth - *Rachiplusia ou* (Gn.) - n to Aweme, Manitoba.

Blue Metal Mark - *Syngrapha selecta* (Wlk.) - w to n Alberta.

Abstrusa Looper - *S. abstrusa* Eichlin - e Canada, w to Alberta and British Columbia.

1 EICHLIN, T.D. and H.B. CUNNINGHA
1978. The Plusiinae (Lepidoptera:N
tuidae) of America North of Mexico, e
phasizing genitalic and larval morpholo
U.S. Dept. of Agric. Tech. Bull. 1567. 1
pp.

2 McDUNNOUGH, J. 1944. Revision
the North American genera and species
the Phalaenis subfamily Plusiin
(Lepidoptera). Memoirs of the S. Ca
Acad. of Sci. 2(2):175-232.

3 ROCKBURNE, E.W. and J.D. LAFO
TAINE. 1976. The cutworm moths
Ontario and Quebec. Canada Dept.
Agric. Publ. 1953. 164 pp.

CHRISTMAS BIRD AND MAMMAL COUNTS - ANNOUNCEMENT

Count period this year is from **Saturday, 15 December 1990** to **Wednesday,** **January 1991**. Count area should be a circle 24 km (15 mi.) in diameter. Counts mu be a minimum of 3 hours in duration. Count forms will be mailed to compilers wh submitted counts in 1989. Anyone else wishing to send in a count please write f forms to:

Wayne C. Harris
Box 414
Raymore, Saskatchewan
S0A 3J0

Reports of counts should be sent to Wayne as soon as possible after they are take To be included inthe report in the March 1991 *Blue Jay* they must reach Wayne by **January 1991**.

IPING PLOVER RESEARCH AND ONSERVATION IN CANADA

PAUL GOOSSEN, Canadian Wildlife Service, Room 210, 4999 - 98 Avenue,
dmonton, Alberta. T6B 2X3

The Piping Plover is a small North nerican shorebird which received relaely little attention from researchers til the 1980s when concern was exssed that this species had suffered a ious population decline.[31] In 1985, the mmittee on the Status of Endangered ldlife in Canada (COSEWIC) declared Piping Plover to be an endangered cies based on a status report recomndation,[31] while the United States Fish Wildlife Service (USFWS) declared plover to be endangered in the Great es region and threatened elsewhere as 1986.[71] In 1988, the population on the rth American breeding grounds was imated to be about 4300 adults (Table Piping Plovers winter in the southern ited States, Mexico and on Caribbean nds,[36] however wintering ground surs have only accounted for about 1730 individuals (adults and young in their first year).[65]

About the turn of the last century, hunting contributed to the plover's decline,[7] but more recently, water level regulation, habitat modification, predation and human disturbance have been implicated.[41]

The present overview, an expanded version of an upcoming article,[30] provides an update on surveys, research and conservation activities by various Canadian agencies and provides a major focus on the period 1985-1988. Information prior to this period can be found in Haig[31] and McNicholl[61] while some material, falling in the period discussed in this current paper, has been discussed by McNicholl[61] and Haig and Oring.[37]

le 1. NORTH AMERICAN PIPING PLOVER POPULATION ESTIMATES FOR 1988.

ation	*Number of adults*	*Source*
rie and Plains		
da	925	see Table 2
ed States	1612	Susan Haig, unpubl. data
t Lakes		
da	0	Susan Haig, unpubl. data
ed States	31	Susan Haig, unpubl. data
tic coast		
da	465	see Table 2
ed States	1288	Anonymous[5]
s		
da	1390	
ed States	2931	
h America	4321	

Surveys - Distribution and Abundance

National Perspective

The Piping Plover is found in nine of the ten Canadian provinces[36] (Figure 1) and breeds in two principal regions defined in this paper as Prairie Canada (Alberta, Saskatchewan, Manitoba, western Ontario) and Atlantic Canada (Quebec, Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland). Until 1977, Piping Plovers also nested in the Canadian Great Lakes region[55] although breeding may have occurred more recently, in 1981 and 1988.[9]

Based on 1988 data, about 32% (nea 1400 adults) of the North Americ Piping Plover population occurs Canada (Table 1 and 2). Estimates of t Canadian population, published in 19 ranged from about 715-1115 pairs;[36, 71] estimate for 1986 was about 800-8 pairs[41] and less than 700 pairs for 19 (Table 2). An international Piping Plo survey in 1991 on both breeding a wintering grounds will provide the b population estimates to date.

Prairie Canada

Sixty-six percent of the Canadi population is found in Prairie Cana

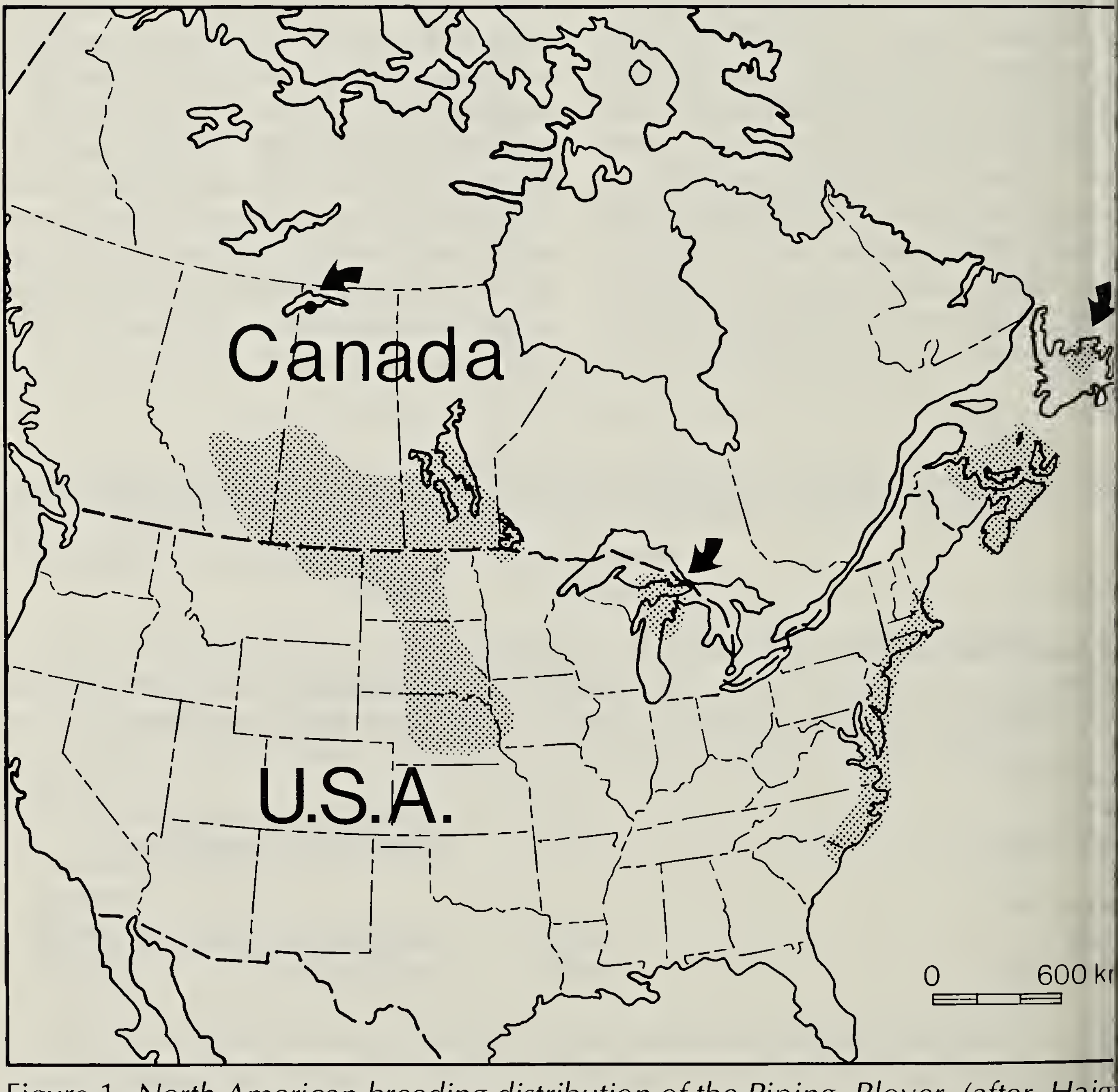


Figure 1. *North American breeding distribution of the Piping Plover (after Haig al.[41] and S. Haig, pers. comm.)*

le 2). In Alberta, the Piping Plover
eding population prior to 1978 was
mated to be 100-110 pairs,[84] but the
major survey, carried out in 1986,
ealed a total of 288 adults.[83] Additional
s checked in 1987 resulted in one
e breeding area being located near
tiskow.[79] Since 1900, habitat loss in
erta is thought to have resulted in a
rease in breeders of less than 10%,
vever drought conditions in 1988
lted in no productivity at some loca-
s and is thought to have influenced a
ine in the provincial population.[82]

e northern-most Canadian record of
ding Piping Plovers occurred in Sas-
hewan at Lake Athabasca and ex-
ed the previously known range by
km.[1] Recent occurrences of Piping
ers in Saskatchewan have mostly
documented on lands under federal
rovincial jurisdiction.[17]

anging habitat conditions,[43] possible
ction in the population[32] and data
ation[73] have influenced the inter-
tion of Saskatchewan Piping Plover population estimates. In 1984, the Saskatchewan population was estimated to be between 2000-2500 plovers. This estimate was based on known and extrapolated data from lake surveys plus an estimate of the remaining potential habitat for plovers in Saskatchewan.[48] However, the 1986 provincial estimate was down 67% at about 700-800 adults[41] and down further to 500 individuals in 1988 (Wayne Harris, pers. comm.). Big Quill Lake, one of the largest and most populated breeding sites in North America, was estimated to have 300+ adults in 1985[47] but a survey done the following year reported less than 50% of that number.[42] The adult population count was up somewhat in 1987, but the number of observed young was down by 46% from 1986.[44] [42] In 1988, only 107 adults and 17 young were reported. Drought conditions[45] probably contributed to decreased numbers of plovers at Big Quill Lake with adults possibly going to different sites.[42]

Populations at Redberry Lake, a site considered for recreational develop-

2. CANADIAN PIPING PLOVER POPULATION ESTIMATES FOR 1988.[a]

nce	Number of adults	Source
Canada		
a	220+	Wershler[82]
chewan	500	Wayne Harris
oba	200	Bill Koonz
io (Lake of the Woods)	5	Maxson *et al.*[59]
ic Canada		
c	74	Pierre Laporte CWS[b]
undland	8	Bruce Johnson CWS
Edward Island	91	Bruce Johnson CWS
cotia	102[c]	Flemming *et al.*[25]
runswick	190	Bruce Johnson CWS
	1390	

estimates reflect 1987 or earlier data as complete surveys were not carried out in all
nces in 1988.
- Canadian Wildlife Service.
ge taken of 1987 range (48-54 pairs).

ment,[74] remained stable at or about 40 individuals in 1984[48] and 1985.[53] At Lake Diefenbaker, an artificial lake created by damming the South Saskatchewan River, fluctuating water levels significantly influence habitat availability for Piping Plovers. In 1984, when water levels were low and habitat was available to plovers, 223 individuals were seen during a survey of about 63% of the eastern part of Lake Diefenbaker's shoreline.[48] In 1986, plovers did not nest because of high water levels.[46] Habitat was available in 1988, however, only 97 adults were found even though more shoreline was covered[46] than in 1984.[48]

Relatively few plovers have been reported on river habitat in Prairie Canada. This contrasts with considerable use of riverine sandbar habitat by plovers in the American great plains.[41] The discovery, in 1988, of 44 plovers along the South Saskatchewan River downstream from Lake Diefenbaker[66] has increased an awareness of the plover's use of river habitat in Prairie Canada. It is not known what, if any, importance rivers have as an alternative nesting area for displaced breeding plovers during drought years when lakes such as Chaplin and Old Wives have little or no water and very few plovers (Wayne Harris, unpubl. data).

Manitoba's plover population, based on data from surveys carried out prior to 1987, is estimated to be about 120-130 individuals.[33] [34] Several previously unknown sites with one or more plovers were located in 1987 by the Manitoba Department of Natural Resources.[64] In 1988 the population was estimated at close to 200 plovers. This increase is thought to have possibly been a result of drought in other areas influencing plovers to move into Manitoba.[54]

The Piping Plovers at Lake of the Woods in western Ontario are included in the plains population.[69] This is the only known annual breeding population in Ontario[55] consisting of up to 10 adu
(1981-1988).[55] [50] [51] [52] [59]

Great Lakes Canada

Historically, the Great Lakes popu
tion in Ontario has been estimated
about 150-160 pairs, with most at La
Erie, particularly Long Point.[69] T
species' decline in the Great Lakes regi
has been so great that it can be co
sidered extirpated[69] although there
two possible breeding records (1981 a
1988) in the last decade.[9] Human dist
bance[69] and predation[55] are thought
have contributed to the decline.[69]

Atlantic Canada

The Piping Plover population in Atla
tic Canada ranged from about 445-5
adults based on 1982 and 1984 inform
tion.[36] The 1988 population estimate
Atlantic Canada, 465 adults, is
proximately 34% of the Canadian plo
population with 82% of the Atlar
Canada plovers occurring in N
Brunswick, Nova Scotia and Prince
ward Island (Table 2). In these lat
provinces, the annual breeding popu
tion at three National Parks has rang
from 45 to 52 pairs during 1984 to 19
The lowest breeding population
Kouchibouguac National Park, N
Brunswick, was recorded in 1988 w
only nine breeding pairs reported, do
from the high of 21 in 1983. In contra
Prince Edward Island National Park h
its highest count in 1988, with 28 bre
ing pairs located.[13] The breeding popu
tion in Kejimkujik National Park's Seas
Adjunct, Nova Scotia has varied fror
high of at least 27-29 pairs in 1976 (d
only from Cadden Beach[10] currently
Catherines River Beach[68]), to nine bre
ing pairs in 1987.[13] In 1988, the Canad
Parks Service (CPS), in addition to surv
ing plovers in National Parks, also s
veyed nine provincial beaches in No
Scotia and recorded 12-14 breeding pa
and 13 fledged chicks.[67] In Quebec
population is estimated to be less than
pairs (Table 2). Since 1979, populat

stimates for the Magdalen Islands have
aried from 30 pairs in 1979[12] to 20 pairs
1983[18] to 37 pairs plus four individuals
1987.[70] Surveys prior to 1987 were not
nsidered to be exhaustive as was the
87 survey, and therefore evaluating the
pulation trend is difficult.[70] However
e latter report concluded the population
is fairly stable. In the 1980s, the New-
undland plover population appears to
ve remained at less than 12 adults (Joe
azil, pers. comm.).

n Nova Scotia, a decrease of 3.3-5.8
irs/year was believed to have occurred
m 1983 to 1987.[25] In Quebec, adults
d young were seen along the Gulf of St.
wrence's north shore as recently as
86,[87] however no Piping Plovers were
n during a 1988 survey.[20]

search

tional Perspective

nly four major research projects on
ing Plover biology have been com-
ted in Canada - two in Prairie Canada[35]
d two in Atlantic Canada.[10] [23]

irie Canada

hyte conducted a two-year study at
Quill Lake, a large prairie lake in
katchewan. His fieldwork con-
trated on breeding chronology, ter-
iality, choice of nest locations and
oductive success. Hatching success
only 28.6% in 1980 and 8.8% in
1 while fledging success was consid-
ly higher (66.7% in 1980 and 86.0%
981). Predation by Ring-billed Gulls
suspected and may have caused the
nest success.[85]

Manitoba, Haig carried out a major
of the breeding biology of Piping
ers.[35] She found that almost 70% of
ts which survived returned the fol-
ng year to the area where they had
and that there was no significant
ence in return rates between males
females. Although most pairs
changed mates between years, the majority retained mates after nest loss.[39] Like Whyte,[85] Haig found nest success to be poor with 64% of the nests failing in her study, most likely because of predation, storms and human disturbance. She determined that only about one chick fledged from a nest.[39] Haig also did genetic research on various North American populations; no convincing support could be found for taxonomically dividing this plover into two subspecies[38] as does the American Ornithologists' Union.[2] Haig has also provided the most comprehensive overview of Piping Plover distribution in North and Latin America.[36] [40]

A recent analysis of Piping Plover productivity data from the Prairie Canada and American great plains population questions whether the population will sustain itself since not enough young may be being produced. Using a theoretical model to determine productivity required for population stability, researchers determined that between 1.15-1.44 fledged chicks/pair is required to maintain the western population. Known productivity was found to be only 1.12 ± 0.33 (standard error) fledged chicks/pair in the prairie and plains population. Theoretical production values, which serve as a tentative benchmark need to be tested further.[27]

Atlantic Canada

Cairn's research in Nova Scotia resulted in the first comprehensive description of Piping Plover territorial and courtship behaviour.[10] [11] She found that fledging success was lower on beaches with greater recreational activity compared with her main study area, Cadden Beach, which had more limited recreational use.[10] [12] A one-season study by Tull in and near Kouchibouguac National Park, New Brunswick, found that reproductive success in early nests was greater than those initiated later.[76] Tull also found that human disturbance or lack thereof, was not an important factor affecting productivity, however disturbance was relatively limited at his study site and may not have been sufficient to show an impact. Further study in Nova Scotia revealed that disturbance was not an important factor for young chicks (10 days) but was for older chicks (17 days).[25] For this latter group, significantly fewer survived per pair (0.5) on beaches with disturbance compared with those surviving (1.8) on beaches with less activity. This study suggests behavioural changes in response to human presence such as decreased chick brooding and feeding, may make chicks more vulnerable to predation and the elements.

Productivity has also been determined by CPS for Piping Plovers breeding in some Atlantic National Parks. The number of chicks fledged per pair has varied from 1.5-2.2 in Kouchibouguac National Park [76] [13] to 0.7-2.8 in Prince Edward Island National Park [15] [63] [86] to 0.3-2.1 in Kejimkujik National Park.[68] [11]

In Nova Scotia, during 1979-1983, fledging success was reported to be 1.2 chicks/pair/nest initiated.[25] It should be noted that there is variation in the above studies as to the definition of a fledged chick and some give minimum-maximum ranges because of the difficulty in determining the number of fledged chicks.

Conservation

National Perspective

Piping Plovers are protected by the Migratory Birds Convention Act of 1917 and additional conservation measures are afforded through the Canada Wildlife Act of 1973. As of fall 1990, Canada has no federal endangered species act, but Manitoba (Bill Koonz, pers. comm.), Quebec (Pierre Laporte, pers. comm.), Ontario and New Brunswick have endangered species legislation.[77] At the national level, species status designations in Canada are assigned by COSEWIC but
not carry legislative powers.

After the Piping Plover's status h
been upgraded in 1985 from threate
to endangered in Canada by COSEW
steps were taken to develop a natio
approach to conserving the species
laying the groundwork for a natio
recovery plan.[60] The recovery plan[6] h
been approved (Tim Lash, pers. com
and is complementary to the t
American recovery plans already
place.[22] [41] Research and conservation
tions, outlined in the Canadian Pip
Plover Recovery Plan, are aimed at reta
ing the Canadian plover population a
its distribution.[6] Overall Canadi
recovery efforts are administered throu
a national coordinator while two regio
teams are responsible for regional pl
ning. Recently, Canada and the Uni
States have recognized that internatio
cooperation is important to Piping Plo
conservation and have participated jo
ly in recovery team meetings.

Federal, provincial and nongove
ment agencies have initiated a variet
research and/or conservation measu
(Table 3). Nongovernment agencies h
been successful in providing publi
about the plover's plight and have s
ported plover surveys and conservati
For example, the Canadian Nat
Federation has been active in hab
preservation (B. T. Aniskowicz, p
comm.) and through its publication,
ture Canada, has made Canadians aw
of this plover.[3] [62] [74] Support for survey w
has come from World Wildlife F
(WWF), the Elsa Wild Animal Appea
Canada, the Saskatchewan Natural
tory Society (SNHS),[29] the Province
Quebec Society for the Protectio
Birds[70] and the Natural History Societ
Prince Edward Island (NHSPEI) (Dan
Askill, pers. comm.). Ducks Unlimi
SNHS, Wildlife Habitat Canada
WWF have supported habitat enha
ment efforts (Dale Hjertaas, pers. com

	Official Provincial Status	*Surveys*	*Banding*	*Habitat Development*	*Signage*	*Patrols*	*Management Plan*[a]	*Public Information/ Education*
Atlantic Canada								
Newfoundland	None	*				*		*
Prince Edward Island	None	*			*	*	*[b]	*
Nova Scotia	None	*	*[c]	*	*	*	*[b]	*
New Brunswick	None	*	*[d]		*	*	*[b]	*
Quebec	None	*					*	*
Great Lakes Canada								
Ontario	Endangered	*					*	*
Prairie Canada								
Ontario	Endangered	*			*	*	*	*
Manitoba	None	*	*	*	*		*	*
Saskatchewan	None	*	*	*				
Alberta	Endangered[e]	*	*				*	*

[a] Approved or *in preparation.*
[b] Refers to a Canadian Parks Service management plan. No provincial plan prepared.
[c] Cairns.[11]
[d] Haig and Oring.[38]
[e] Listed as endangered under the Alberta Wildlife Act but in policy the status is considered as vulnerable. Note that the term endangered in the Act encompasses species considered to be endangered, threatened and vulnerable (Steve Brechtel, pers. comm.).

Prairie Canada

Within the last five years, the participation of agencies in Piping Plover conservation in Prairie Canada has increased and demonstrates a heightened interest in this migratory plover. The Prairie Piping Plover Recovery Team has identified priority action plans.[29] These strategies will serve to implement the interests of the national plan at the regional level. In addition to the national recovery plan, provincial management or recovery plans have been initiated in Ontario,[28] Manitoba[34 8] and Alberta.[82]

General suggestions regarding Piping Plover management in Alberta have been previously outlined[78] while specific management suggestions have been made for protecting plover habitat from cattle disturbance and/or recreational activities at Little Fish Lake and one of the Reflex Lakes.[80 81] Habitat enhancement projects have been initiated in both Saskatchewan and Manitoba. Nesting substrate has been increased at two lakes in Saskatchewan, Chaplin[45a] and Little Quill, through the spreading of gravel on lakeshore habitat (Dale Hjertaas, pers. comm.). Since Piping Plovers successfully use a variety of artificial habitats for nesting,[41] a proposed dyke to enhance waterfowl production, at Old Wives Lake in southern Saskatchewan, if constructed, may provide suitable plover nesting habitat.[32] In Manitoba, habitat modification has been attempted at Lake Winnipeg (Bill Koonz, pers. comm.) and Lake Manitoba.[34] In 1982, breeding habitat on the southeastern shore of Lake Manitoba was protected by the Manitoba government declaring the site a Special Conservation Area.[34] A sign at Sable Islands Provincial Nature Reserve, Lake of the Woods, Ontario was erected in part to contribute to conserving breeding Piping Plovers (Leo Heyens, pers comm.).

Great Lakes Canada

Although Piping Plovers do not currently breed in this part of Canada, both the
proposed national[6] and Ontari
recovery plans have set as one of th
goals, the re-establishment, if feasible,
the plover in this region.

Atlantic Canada

Of nine National Parks and one Natio
al Park Reserve in Atlantic Canada, or
Prince Edward Island National Par
Kouchibouguac National Park ar
Kejimkujik National Park's Seaside A
junct harbour Piping Plovers. Each
these three parks has a management pl
for Piping Plovers.[14 26 68] CPS has us
signs, fences and warden patrols to affo
protection to some nesting areas and i
terpretive hikes, slide shows ar
pamphlets assist in educating the gener
public (Gary Corbett, pers. comm.). Sin
maritime storms cause nest loss,[4] CPS h
considered removing eggs, incubati
them and then replacing them (Gary Co
bett, pers. comm.). Piping Plover eg
have been successsfully hatched by arti
cial means and the resulting you
released into the wild.[63] Predation is co
sidered to be a greater problem th
human disturbance in Atlantic Canac
but it may be related indirectly to hum
activity (Gary Corbett, pers. comm.).
forts to control predators have been
tempted[67] and nest exclosures have be
successfully used in decreasing prec
tion.[21] Since there is evidence to sugg
that plovers have a higher hatching su
cess when nesting near breeding ter
than in the terns' absence, considerati
should be given to the suggestion
manage tern colonies in order to bene
plover conservation.[16] CPS has also co
piled an extensive bibliography with ov
200 references cited on literature perta
ing to this species.[57]

For more than 10 years, the NHSPEI h
been actively promoting Piping Plov
conservation. The society has conduct
surveys for plovers, helped in planni
workshops, initiated a program to conta
landowners, and supported public re
tion efforts including a Piping Plov

deo and poster (Dan McAskill, pers. mm.). The landowner contact program vealed over 75% support by land- vners for plover conservation. Distur- ances identified by landowners cluded use of All Terrain Vehicles, bitat alteration and recreational ac- ities.[58]

On Quebec's Magdelan Islands, beach ffic during the plover's breeding season heightened in July during part of the ick-rearing period. The primary con- vation recommendation for these is- ds is to control traffic so as to decrease st loss and secondarily to consider bitat creation.[70] Additional discussion plover conservation is found in a draft ebec recovery plan.[56]

diversity of techniques has been used attempts to increase populations of ferent bird species,[75] however, only ited experimentation has been in- ted to encourage plover productivity and none has yet been used to increase genetic diversity. Reciprocal egg fostering among different plover demes has been suggested as a means to increase genetic diversity.[24] However a recent genetic study has shown that inbreeding in Piping Plovers is not a concern.[38]

The future of the Piping Plover in Atlantic Canada is somewhat clouded by a predicted warming trend in the earth's climate which may result in coastal flooding[49] thereby reducing available nesting habitat and decreasing plover productivity. However, any future threats to the plovers and their coastal habitat will be challenged by the concern and commitment of dedicated conservationists in Atlantic Canada to attempt to ensure the continuing presence of the Piping Plover on east coast beaches.

Conclusion and Recommendations

Most provinces, with the exception of Saskatchewan, have an adequate

ng Plover

Geoff Holroyd

account of the Piping Plover populations within their jurisdictions. Furthermore, population estimates in Saskatchewan have varied considerably between researchers, and the importance of clarifying the abundance of plovers in this province is of international significance, as the estimated population may account for 12% (Table 1) to perhaps 50% of the total continental population.[48]

In Prairie Canada there are several concerns which need to be addressed. Further clarification of the plover's distribution and protection of its habitat is needed. As to research, long-term data are needed on population dynamics, dispersal and productivity to determine the nature of population fluctuations and the adequacy of reproductive output in maintaining a self-sustaining population.

In Atlantic Canada, information is needed on wintering locations of the breeding population (Richard Dyer, pers. comm.) while research and management is required to reduce nesting failure caused by predators and storms. The possible impact of illegal shorebird hunting in some locations in Newfoundland[19] should be evaluated and appropriate action taken to provide public education. In both Atlantic and Prairie regions, conservation must take priority if the plover's status is to be downlisted or de-listed. In order to effectively conserve the continental breeding population of Piping Plovers, joint action by Americans and Canadians[72] must continue in cooperation with those Latin American countries where the plovers winter. Finally, it is of utmost importance that landowners and the general public take responsible conservation actions for habitat preservation during occupational and recreational activities.

Acknowledgements

I thank B. T. Aniskowicz (Canadian Nature Federation), Peter Austin-Smith (Nova Scotia Department of Lands and Forests), Irene Bowman (Ontario Ministry of Natural Resources (OMNR)), Joe Br (Department of Culture, Recreation a Youth, Newfoundland), Joe Carre (Canadian Wildlife Service (CWS), O tario), David Cartwright (Department Natural Resources, New Brunswic Gary Corbett (CPS, Atlantic Region), Darby (OMNR), Randy Dibblee (Dep ment of Community and Cultural Affa Prince Edward Island), Richard D (USFWS), Gary Erickson (Department Forestry, Lands and Wildlife (DFLW), berta), Dale Hjertaas (Department Parks and Renewable Resources (DPR Saskatchewan), Bruce Johnson (CWS, lantic Region), Bill Koonz (Departmen Natural Resources, Manitoba), Pi Laporte (CWS, Quebec Region), Mic Lepage (Ministère du Loisir de la Cha et de la Pêche, Quebec) Dan McAs (NHSPEI) and Dave Moore (DFLW, Alb ta) for providing me with information research and/or conservation in th various jurisdictions. The Potash C poration of Saskatchewan kin provided me with survey reports for Quill Lake. Gary Corbett (CPS), Ro Edwards (CWS), Gary Erickson (DFL Susan Haig (USFWS), Peter Hick (CWS), Dale Hjertaas (DPRR), Br Johnson (CWS), Pierre Laporte (CW Guy Morrison (CWS), Sheila Lamont (S katchewan Natural History Society) a two reviewers each commented or draft(s) of the manuscript. Susan M Eachran (CWS) drafted the figure.

[1] ADAM, C.I.G. 1984. Piping Plov *Charadrius melodus*, at Lake Athaba Saskatchewan: a significant northw range extension. Can. Field-Nat. 98:59-

[2] AMERICAN ORNITHOLOGIS UNION. 1983. Check-list of No American birds, 6th ed. Am. Ornith. Uni Washington, D.C. 877 pp.

[3] ANONYMOUS. 1986. Plover targe conservationists. Nat. Canada 15(1):4

[4] ANONYMOUS. 1986. Annual rev 1985-1986. Can. Wildl. Serv. 35 pp.

ANONYMOUS. 1989. Birdnotes. The iving Bird 8(3):5.

ATLANTIC AND PRAIRIE PIPING LOVER RECOVERY TEAMS. *In prepara- on.* Canadian Piping Plover recovery plan.

ENT, A.C. 1929. Life histories of orth American shore birds. Smiths. Inst. . S. Nat. Mus. Bull. 146.

ERGER, R. 1988. Piping Plover *haradrius melodus*) recovery plan for anitoba. Unpubl. draft. Univ. of Man. 45 . plus appendices.

URNETT, J. A., C. T. DAUPHINÉ, Jr., S. . MCCRINDLE and T. MOSQUIN. 89. On the brink. Western Producer airie Books, Saskatoon. 192 pp.

AIRNS, W.E. 1977. Breeding biology d behaviour of the Piping Plover *haradrius melodus*) in southern Nova otia. Unpubl. M. Sc. thesis, Dalhousie iv. 100 pp. plus appendices.

AIRNS, W.E. 1982. Biology and be- vior of breeding Piping Plovers. Wilson ll. 94:531-545.

AIRNS, W.E. and I.A. MCLAREN. 80. Status of the Piping Plover on the st coast of North America. Am. Birds :206-208.

ORBETT, G.N. 1988. Summary port. Status of Piping Plover in Canada's tional Parks 1988. Unpubl. Can. Parks rv. report. 4 pp.

RBETT, G.N. and B.I. BALL. 1980. management plan for Piping Plover, *aradrius melodus*, in Prince Edward Is- d National Park. Unpubl. report for rks Canada, Atlantic Region. 61 pp. plus endices.

OWE, A. 1984. Piping Plover sur- Prince Edward Island National Park. ubl. report for the Can. Wildl. Serv. and ks Canada. 23 pp. plus tables, figures appendices.

OWE, A. 1987. 1987 Piping Plover vey Prince Edward Island National k. Unpubl. Parks Canada draft report.

17 DALE, B. 1986. Land tenure of areas critical to Piping Plovers in Saskatchewan. Unpubl. report prepared for the Sask. Natural History Soc., Saskatoon. 24 pp.

18 DAVID, N. 1983. The nesting season June 1 - July 31, 1983. Quebec Region. Am. Birds 37:970-971.

19 DEICHMANN, H. and R. BURROWS. 1983. Importance of the northeast coast of Newfoundland from Deadmans Bay to Cape Freels to migrant and nesting shorebirds and the threat these birds face from illegal shooting. Osprey 14:9-14.

20 DEMERS, A. and P. LAPORTE. 1988. Inventaire des habitats du Pluvier siffleur sur la Côte Nord et en Gaspésie. Unpubl. Can. Wildl. Serv. report. 45 pp.

21 DRYSDALE, C., D. REIVE and G. KENNEY 1988. An evaluation of Piping Plover (*Charadrius melodus*) nest protection strategy in the Kejimkujik National Park Seaside Adjunct. Unpubl. Can. Parks Serv. report. 11 pp.

22 DYER, R.W., A. HECHT, S. MELVIN, C. RAITHEL and K. TERWILLIGER. 1988. Atlantic Coast Piping Plover recovery plan. U. S. Fish and Wildl. Serv., Newton Corner, Mass. 66 pp. plus an appendix.

23 FLEMMING, S.P. 1984. The status and responses of Piping Plover (*Charadrius melodus* Ord) to recreational activity in Nova Scotia. Unpubl. B. Sc. thesis, Acadia Univ. 46 pp. plus tables, figures and appendices.

24 FLEMMING, S.P. 1987. Natural and experimental adoption of Piping Plover chicks. J. Field Ornithol. 58:270-273.

25 FLEMMING, S.P., R.D. CHIASSON, P.C. SMITH, P.J. AUSTIN-SMITH and R.P. BANCROFT. 1988. Piping Plover status in Nova Scotia related to its reproductive and behavioral responses to human disturbance. J. Field Ornithol. 59:321-330.

26 FONTAINE, N. and G. DELANEY. 1985. Piping Plover management plan

Kouchibouguac National Park. Unpubl. report for Parks Canada, Atlantic Region. 18 pp. plus appendices.

[27] GAINES, E.P. and M.R. RYAN. 1988. Piping Plover habitat use and reproductive success in North Dakota. J. Wildl. Mgmt. 52:266-273.

[28] GERSON, H. 1988. Recovery plan for the Piping Plover in Ontario. Unpubl. draft. Ont. Ministry of Natural Resources.

[29] GOOSSEN, J.P. 1989. Prairie Piping Plover conservation: first annual report (1988). Unpubl. Can. Wildl. Serv. report. 19 pp.

[30] GOOSEN, J.P.(sic) 1990. Surveys and conservation of Piping Plovers in Canada. *Wader Study Group Bull.* 57:53-57.

[31] HAIG, S. 1985. The status of the Piping Plover in Canada. Report to the Committee on the Status of Endangered Wildlife in Canada. Nat. Mus. of Natural Sciences, Ottawa. 34 pp.

[32] HAIG, S. 1986. Ducks Unlimited Wood River Delta/Old Wives Lake development: Piping Plover assessment. Unpubl. report to Ducks Unlimited Canada. 11 pp. plus appendix and attachments.

[33] HAIG, S. 1986. Distribution and status of Piping Plovers in Manitoba - 1986. Unpubl. report prepared for the Man. Dept. of Natural Resources and World Wildlife Fund (Canada). 10 pp.

[34] HAIG, S.M. 1987. Piping Plovers in Manitoba - a status report on the species and initial recovery plan for the province. Pp. 243-247 *In* HOLROYD, G.L., W.B. MCGILLIVRAY, P.H.R. STEPNEY, D.M. EALEY, G.C. TROTTIER, and K.E. EBERHART. Proceedings of the workshop on endangered species in the prairie provinces. Prov. Mus. of Alberta Occ. Paper No. 9. 367 pp.

[35] HAIG, S.M. 1987. The population biology and life history patterns of the Piping Plover. Ph.D. dissertation, Univ. of N. Dakota. 121 pp.

[36] HAIG, S.M. and L.W. ORING. 198 Distribution and status of the Piping Plov throughout the annual cycle. J. Field C nithol. 56:334-345.

[37] HAIG, S.M. and L.W. ORING. 198 The Piping Plover. Pp.508-519 *In* Audub Wildl. Report 1987. Nat. Audubon Sc Academic Press, Orlando.

[38] HAIG, S.M. and L.W. ORING. 198 Genetic differentiation of Piping Plove across North America. Auk 105:260-267

[39] HAIG, S.M. and L.W. ORING. 198 Mate, site, and territory fidelity in Pipi Plovers. Auk 105:268-277.

[40] HAIG, S.M. and L.W. ORING. 198 Distribution and dispersal in the Pipi Plover. Auk 105:630-638.

[41] HAIG, S., W. HARRISON, R. LOCK, PFANNMULLER, E. PIKE, M. RYAN and SIDLE. 1988. Great Lakes and Nort ern Great Plains Piping Plover recove plan. U. S. Fish and Wildl. Serv., Tw Cities, Minn. 132 pp. plus appendices.

[42] HARRIS, W.C. 1986. Big Quill La Piping Plover population census - 198 Unpubl. report prepared for the Pota Corp. of Sask. 13 pp.

[43] HARRIS, W.C. 1987. Saskatchewa Piping Plovers. Pp. 239-242 *In* HOLROY G.L., W.B. MCGILLIVRAY, P.H.R. STE NEY, D.M. EALEY, G.C. TROTTIER, ar K.E. EBERHART. Proceedings of th workshop on endangered species in th prairie provinces. Prov. Mus. of Alber Occ. Paper No. 9. 367 pp.

[44] HARRIS, W.C. 1987. Big Quill La Piping Plover population census - 198 Unpubl. report prepared for the Pota Corp. of Sask. 11 pp.

[45] HARRIS, W.C. 1988. Saskatchewa Piping Plover populations (1984 - 198 Unpubl. abstract prepared for the Northe Great Plains Great Lakes Piping Plov meeting held in Lincoln, Neb., 1 Novemb 1988.

HARRIS, W.C. 1988. Piping Plover census and evaluation of the effects of experimental habitat enhancement at Chaplin Lake, Saskatchewan. Unpubl. report prepared for Sask. Natural History Soc. 7 pp.

HARRIS, W.C. 1988. South Saskatchewan River Piping Plover Survey - 1988 (Lake Diefenbaker segment - Riverhurst Ferry to Dam). Unpubl. report prepared for the Sask. Nat. History Soc. 10 pp. plus map.

HARRIS, W.C. and S.M. LAMONT. 1985. Big Quill Lake Piping Plover population survey -- 1985. Unpubl. report prepared for the Potash Corp. of Sask. 24 pp.

HARRIS, W., G. WAPPLE, R. WAPPLE, K. DESMET (sic) and S. LAMONT. 1985. Saskatchewan Piping Plovers - 1984. Unpubl. report prepared for the Sask. Nat. History Soc. and Sask. Parks and Renewable Resources Wildl. Branch. 106 pp. plus appendix.

HENGEVELD, H.G. 1987. Understanding CO_2 and climate. Annual report 1986. Atmospheric Environment Serv., Environment Canada. 23 pp.

HEYENS, L.E. 1986. Piping Plover survey Sable Islands Provincial Nature Reserve. Unpubl. field report, Ont. Ministry of Natural Resources. 2 pp. plus map.

HEYENS, L.E. 1987. Piping Plover survey Sable Islands Provincial Nature Reserve. Piping Plover survey Windy Point - Lake of the Woods. Unpubl. field report, Ont. Ministry of Natural Resources. 3 pp. plus two maps.

HEYENS, L.E. 1988. Piping Plover survey Sable Islands Provincial Nature Reserve. Piping Plover survey Windy Point Lake of the Woods. Unpubl. field report, Ont. Ministry of Natural Resources. 2 pp. plus map and bird checklist.

KERBES, R.H. and J.L. HOWARD. 986. Summary of bird studies and management recommendations for the Redberry Lake area. Unpubl. report prepared by Can. Wildl. Serv. and Sask. Parks and Renewable Resources Wildl. Branch. 14 pp.

54 KOONZ, W. 1988. Piping Plover observations Manitoba 1988. Unpublished Man. Dept. of Natural Resources report. 4 pp. plus a map.

55 LAMBERT, A.B. 1987. Piping Plover. Page 162 *In* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner. Atlas of the breeding birds of Ontario. Univ. of Waterloo Press, Waterloo. 617 pp.

56 LAPORTE, P. 1988. Plan d'action pour le retablissement du Pluvier siffleur au Quebec. Unpubl. Can. Wildl. Serv. draft. 51 pp.

57 LEWIS, H. 1988. Piping Plover bibliography. Unpubl. draft. Can. Parks Serv., Atlantic Region. 23 pp.

58 MACEACHERN, P. and S. BARRETT. 1988. A: Crowbush/Lakeside Piping Plover population survey and landowner contact program. B: Hillsborough Bridge piers Common Tern colony study. Natural History Soc. of Prince Edward Island 1988 Seeds project report. 20 pp. plus appendices.

59 MAXSON, S.J., K.V. HAWS and L.W. ORING. 1988. 1988 status and breeding summary of Piping Plovers and Common Terns at Lake of the Woods, Minnesota. Unpubl. Minn. Dept. of Natural Resources report. 8 pp. plus tables, banding schedule and a figure.

60 MCKEATING, G. 1987. A national perspective and management strategy on the Piping Plover. Pp. 233-234 *In* HOLROYD, G.L., W.B. MCGILLIVRAY, P.H.R. STEPNEY, D.M. EALEY, G.C. TROTTIER, and K.E. EBERHART. Proceedings of the workshop on endangered species in the prairie provinces. Prov. Mus. of Alberta Occ. Paper No. 9. 367 pp.

61 MCNICHOLL, M.K. 1985. Profiles on risk status of Canadian birds: 2. Piping Plover. Alta. Nat. 15:135-138.

[62] MCSWEENY, B.T. 1985. CNF launches plover action plan. Nat. Canada 14(4):53.

[63] MORSE. M. 1982. 1982 Piping Plover survey. Prince Edward Island National Park. Unpubl. Can. Wildl. Serv. and Parks Canada report. 25 pp. plus appendices.

[64] MOSZYNSKI, R., W.H. KOONZ and K. DE SMET. 1988. Manitoba Piping Plover survey, 1987. Unpubl. Man. Natural Resources Wildl. Biological Serv. manuscript report No. 88-03. 24 pp. plus appendices.

[65] NICHOLLS, J. 1988. Winter distribution of the Piping Plover (*Charadrius melodus*) along the Atlantic and Gulf Coasts. Unpubl. abstract prepared for the Northern Great Plains Great Lakes Piping Plover meeting held in Lincoln, Neb., 1 November 1988.

[66] PURDY, M.A. and B.J. WEICHEL. 1988. Piping Plover survey: South Saskatchewan River - Red Deer confluence to Miry Bay and Gardiner Dam to Saskatoon. Unpubl. report prepared for the Sask. Natural History Soc. 13 pp. plus appendices.

[67] REIVE, D. and G. KENNEY. 1988. Piping Plover (*Charadrius melodus*) monitoring program. Kejimkujik National Park Seaside Adjunct 1988. Unpubl. Can. Parks Serv. report. 35 pp. plus appendices.

[68] REIVE, D., G. KENNEY and C. DRYSDALE. 1988. A management plan for Piping Plover (*Charadrius melodus*) Kejimikujik National Park, Seaside Adjunct. Unpubl. Can. Parks Serv. report.

[69] RUSSELL, R.P. 1983. The Piping Plover in the Great Lakes region. Am. Birds 37:951-955.

[70] SHAFFER, F. and C. PINEAU. 1987. État du pluvier siffleur (*Charadrius melodus*) aux îles-de-la-Madeleine. Assoc. québécoise des groupes d'ornithologues. 15 pp. plus map, graphs, tables and appendices. (English translation and French version accessed).

[71] SIDLE, J.G. 1985. Endangered a
threatened wildlife and plants; determi
tion of endangered and threatened sta
for the Piping Plover. Fed. Regis
50(238):50726-50734.

[72] SIDLE, J. 1987. Piping Plover on
American great plains. Pp. 249 *In* H
ROYD, G.L., W.B. MCGILLIVRAY, P.H
STEPNEY, D.M. EALEY, G.C. TROTTI
and K.E. EBERHART. Proceedings of
workshop on endangered species in
prairie provinces. Prov. Mus. of Albe
Occ. Paper No. 9. 367 pp.

[73] SMITH, A.R. 1986. An analysis
Piping Plover surveys in Saskatchew
with recommendations on survey pro
dures. Unpubl. Can. Wildl. Serv. draft.

[74] SPEER, C. 1987. Resort on plover t
ritory. Nat. Canada 16(1):49.

[75] TEMPLE, S.A. (ed.). 1978. E
dangered birds. Management techniq
for preserving threatened speci
Proceedings of the symposium
management techniques for preserv
endangered birds. Univ. of Wisc. Pre
Madison. 466 pp.

[76] TULL, C.E. 1984. A study of the nest
Piping Plovers of Kouchibouguac Natio
Park 1983. Unpubl. report prepared
Parks Canada. 79 pp. plus appendices

[77] VERSTEEG, H. 1984. The protect
of endangered species: a Canad
perspective. Ecology Law Quart. 11:2
304.

[78] WERSHLER, C.R. 1987. The Pip
Plover in Alberta. Pp. 235-237 *In* H
ROYD, G.L., W.B. MCGILLIVRAY, P.H
STEPNEY, D.M. EALEY, G.C. TROTTI
and K.E. EBERHART. Proceedings of
workshop on endangered species in
prairie provinces. Prov. Mus. of Albe
Occ. Paper No. 9. 367 pp.

[79] WERSHLER, C.R. 1988. Piping Plo
breeding habitat census and monitor
program Alberta 1987. Unpubl. rep
prepared for World Wildlife Fund Cana

Alberta Fish and Wildl. and the Can. Wildl. Serv. 6 pp.

WERSHLER, C.R. 1988. Monitoring of Piping Plovers, habitat, and land use at Little Fish Lake, Alberta. Unpubl. report prepared for Alberta Recreation and Parks, World Wildlife Fund Canada, Alberta Fish and Wildl. and the Can. Wildl. Serv. 10 pp. plus two maps.

WERSHLER, C.R. 1988. Monitoring of Piping Plovers, habitat, and land use at Reflex Lake, Alberta. Unpubl. report prepared for World Wildlife Fund Canada, Alberta Fish and Wildlife and the Can. Wildl. Serv. 10 pp. plus copy of an airphoto.

WERSHLER, C. *In preparation*. Draft management plan for the Piping Plover in Alberta. Prepared for Alberta Fish and Wildlife and World Wildlife Fund (Canada).

WERSHLER, C. and C. WALLIS. 1987. Status of the Piping Plover in Alberta 1986. Unpubl. report for World Wildlife Fund (Canada), Can. Wildl. Serv., and Alberta Fish and Wildl. 53 pp.

84 WESELOH, D.V.C. and L. MCKEANE WESELOH. 1983. Numbers and nest site characteristics of the Piping Plover in central Alberta, 1974-1977. Blue Jay 41:155-161.

85 WHYTE, A.J. 1985. Breeding ecology of the Piping Plover (*Charadrius melodus*) in central Saskatchewan. Unpubl. M. Sc. thesis, Univ. of Sask. 124 pp. plus appendix.

86 WILLIAMS, K. A. 1983. 1983 Piping Plover survey. Prince Edward Island National Park. Unpubl. Can. Wildl. Serv. and Parks Canada report. 25 pp. plus an appendix.

87 YANK, R. and Y. AUBRY. 1986. The nesting season June 1-July 31, 1986. Quebec region. Am. Birds 40:1180-1182.

ng Plover nest

G.J. Smith

OLIVACEOUS CORMORANT — FIRST RECORD FOR CANADA

FRANK BRAZIER, 2657 Cameron Street, Regina, Saskatchewan. S4T 2W5

The morning of 8 September 1989 in Regina was a dull one, overcast, with occasional brief light rain showers. About 10:00 a.m. I was walking eastward on the north side of Wascana Lake and when I was opposite the north end of Willow Island I left the asphalt walkway and crossed an open area towards a gap in the dense carragana hedge which grows along the bank. The instant I reached the gap a cormorant skittered along the water in panic and flew westward out of sight. It was about 15 m from me when it took off. I thought, "What a small cormorant! And why the panic?" The Double-crested Cormorants which frequent Wascana Lake in spring and fall often allow a fairly close approach, and then usually dive rather than fly.

Later, at about 11:30 a.m., I had reached the south end of Albert Memorial Bridge at the west end of Wascana Lake and was walking north over it when the thought struck me that the small cormorant may have joined the few Double-cresteds that are often on the deep water on the east side of the bridge (which contains a weir), so I stopped at a bench and scanned the water. Sure enough! With four Double-cresteds I could see the small one swimming placidly, and through my binoculars I could see that its neck was noticeably thinner and shorter than that of the others; the gular pouch was a dull yellow, with some white on either side. The front of the neck and that part of the breast visible was also yellowish, indistinguishable from the pouch colour at that distance (ca. 25 m). The most noticeable feature was its small size compared with the Double-cresteds.

My car was parked nearby and sho I was describing the bird to Paul Jam Saskatchewan Museum of Natural H tory staff. Since it was nearly noon decided to go and look, as the locale v nearby. I told him to look for a sm cormorant, about half the size of others.

After I got home about 12:30 p.m called Robert Kreba at his home a when I had described the bird to him offered an identification as an Olivace Cormorant, because that small cormor had been seen in South Dakota. Reg tably, neither Paul James nor Rob Kreba were able to find the bird I h seen, nor did anyone else.

Once Bob had given me the clu searched the bird books I had for a po tive identification. Robbins pictured immature Olivaceous with the light str on the foreneck and white on the face reaches the Louisiana Coast where breeds. Lowery states: "The body of t species is about half as large in bulk that of the Double-crested Cormorant so my remarks to Paul James were corr as to size. Lowery also notes: "Immatu of the two species in the first wir plumage are indistinguishable from ea other in the field except by size."[8]

The normal range of the Olivace Cormorant extends from the Louisia coast south to Tiera del Fuego on coa waters and fresh lakes and streams. own records are of observations Mazatlan, Mexico (1975), Trinid (1976), Belize (1978) and Panama (19 but I do not recall seeing immatu which the Wascana bird obviously wa ffrench notes that the Olivaceous Cor- rant is a game bird in Trinidad and bago.[4] My experience in Mexico leads to suggest that these birds are also ken for the pot, along with anything else at's edible. This would explain the nic flight I saw.

his cormorant in the literature has n known as Neotropic, Brazilian, xican, and Bigua, but Olivaceous is name now used.

he Olivaceous Cormorant often ap- rs on the California coast, and there some inland records. Possibly those t occur in the Gulf of California nder north as there are records in theastern Arizona at Lake Patagonia;[2] l Paso, Texas (31 Jan., 10 Feb. 1983), Nebraska (Oct. 1982);[10] at Lake d, Nevada (16 Dec. 1978, 12 March 9);[5] [6] Lamar, Colorado (17 July - ust 1988); Pierre South Dakota (3 July August 1985 - first state record);[3] re, S. Dakota, (23 June 1987 - second record).[1]

ave searched the "Indexes of bold- d birds" of *American Birds* and its lecessor *Audubon Field Notes* back . 21 (1967), as well as every issue of *finding in Canada*, and the indexes of *adian Field-naturalist* and its ecessors back to 1924, without find- any mention of Olivaceous tropic) Cormorant. The books *Birds* *anada*, revised edition, and *The* *ralist's guide to the Victoria region* do ecord it, nor does the *Checklist of* *of Victoria and Southeastern Van-* *er Island* (May 1989). If any bird lered north along the Pacific coast to da the latter two publications ably would have recorded such a entous event. In addition I wrote to Nero in Winnipeg, but he knew of htings for Manitoba, and also Alan nington, of Point Pelee National who stated "There is definitely *no* record of Olivaceous Cormorant in Canada ..." I believe my sighting of one on 8 September 1989 on Wascana Lake in Regina is the first for Canada.

I thank Robert Nero and Alan Wormington for their assistance.

I offer the above sighting of an Olivaceous Cormorant as an addition to the hypothetical list of Saskatchewan birds.

[1] BERKEY, G.B. 1987. The nesting season, June 1 - July 31, 1987. *Am. Birds* 41(3):

[2] DAVIS, W.A. and S.M. RUSSELL. 1979. Birds in southeastern Arizona. Tucson Audubon Soc., Tucson.

[3] FAANES, C.A. 1985. The nesting season, June 1 - July 31, 1985. *Am. Birds* 39(5):

[4] FFRENCH, RICHARD. 1973. A guide to the birds of Trinidad and Tobago. Livingston Publ. Co., Wynnewood, Pa.

[5] KINGERY, H.E. 1979. The winter season, Dec. 1, 1978 - Feb 28, 1979. *Am. Birds* 33(3):

[6] KINGERY, H.E. 1979. The spring migration, Mar. 1 - May 31, 1979. *Am. Birds* 33(5):

[7] KINGERY, H.E. 1985. The nesting season, June 1 - July 31, 1985. *Am. Birds* 42(5):

[8] LOWERY, G.H., Jr. 1960. Louisiana birds. Louisiana State Univ. Press, Baton Rouge

[9] ROBBINS, C.S. 1966. Birds of North America. Golden Press, N.Y.

[10] WILLIAMS, FRANCES. 1983. The winter season, Dec. 1, 1982 - Feb. 28, 1983. *Am. Birds* 37(3):

INAPPROPRIATE ESCAPE BEHAVIOU OF CANADA GEESE WITH YOUN

E. OTTO HOHN, 11511 - 78 Avenue, Edmonton, Alberta. T6C 0N4

On the afternoon of 20 May 1990 I disturbed a Canada Goose from a point of land on Hastings Lake (about 40 km e of Edmonton). As the goose took to water its young, which swam in a row ahead of the adult, became visible and it became evident that they were led by another parent which swam so completely submerged that only the brownish hump of its back was visible above the water. I watched the family through 8x40 binoculars as they swam quickly until they were at least 60 m away from me. During this time the submerged adult never raised its head above water to take a breath while the nearer adult swam with neck very erect and was evidently keeping an eye on me.

Bent states that when a family party of these birds moves over water the gander usually leads the procession.[1] I believe this was not the case in this instance, because the rear bird was large and was evidently standing on guard when I first became aware of the family. Furthermore, the posture assumed by the almost submerged adult resembled that adopted by incubating geese when they are aware of being observed; they lay their head and neck flat along the ground so that only the hump of their backs remains conspicuous.

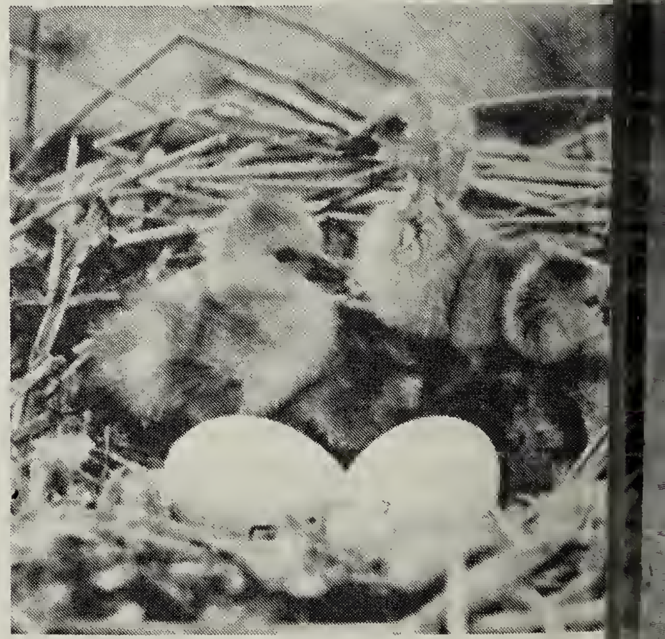
This behaviour is comparable yet different from an observation by P.A. Taverner, reported by Bent. Taverner described a goose family pursued on a lake by a motor boat. The geese swam fast and arranged themselves in a single row, one parent leading, the other bringing up the string of young from the rear. The adults swam with necks outstretched and laid them flat on the water. From the distance of the observer they looked a floating stick and would never imp the casual eye as a family of Can Geese.

This behaviour was evidently succ ful in making the goose family in spicuous. My observation, on the o hand, shows the limitations of instinc behaviour; the strenuous underwater ertions by the leading goose (whateve sex) were annulled by the rear a which swam most conspicuously.

During the same weekend I c across another instance of inappropr instinctive behaviour. Beavers which recently reinvaded the cattail marsh my acreage had not only added fresh to the dam at the outlet of the pond had done the same at the only inflo water form an adjacent smaller pon

---

[1] BENT, A.C. 1925. Life historie North American wild fowl, Part two. S sonian Inst., U.S. Natl. Mus. Bull. Dover Reprint, N.Y. 1962.



Goslings at nest R.E. G

UNUSUAL CONCENTRATIONS OF SANDHILL CRANES DURING THE BREEDING SEASON

.H. KOONZ, Manitoba Department of Natural Resources, Box 14, 1495 St. James
reet, Winnipeg, Manitoba. R3H 0W9

On 14 and 15 June 1989, Blair Mc-
ahon and I observed large numbers of
lult Sandhill Cranes feeding in a recent-
germinated grain field on the west side
PTH #276 near Waterhen (51° 47'N,
°35'W). Starting in mid-afternoon on
June, cranes were noticed flying in
m all directions. By 8:30 p.m., 86-90
anes had assembled on the field. At
55 p.m. all but a handful of birds had
wn away. The area was also checked
15 June when at least 112 adult cranes
re observed in the field at 6:30 p.m.
ndhill Cranes typically aggregate in
rly morning and late afternoon feeding
cks during spring, fall and winter, but I
uld not find reference to adults con-
ntrated into feeding areas during the
eding season.[1] It may be that these birds were non-breeders spending the breeding season in the Westlake area. Non-breeding concentrations of Canada Geese are known to use traditional feeding areas, but this phenomenon has not been reported for Sandhill Cranes.

The observations seemed out of the ordinary given that young cranes should have been with their parents at that time of the year. Dry conditions and massive local fires likely contributed to poor 1989 Sandhill Crane productivity in Manitoba's Interlake, Westlake and boreal forest areas.

[1] STEPHEN, W.J.D. 1967. Bionomics of the Sandhill Crane. Can. Wildl. Serv. Rept. No. 2. 48 pp.

ndhill Crane *Larry Morgotch*

ROSS' GULL NEAR SASKATOON, SASKATCHEWAN

JIM WEDGWOOD, 610 Leslie Avenue, Saskatoon, Saskatchewan. S7H 2Z2

My birding highlight in 1989 was on 24 October when a Pileated Woodpecker, a Clark's Grebe and a Ross' Gull, all Saskatoon area rarities, were seen. Always-hoped-for conditions prevailed each time: light from behind the observer, bird sufficiently close for good viewing and staying long enough for adequate study. Need to assure myself of the gull's identity was fillip for further inquiry on it.

About 7:30, shortly after sunrise under broken overcast, I was scanning the valley from a 5-m high bank on the east side of the South Saskatchewan River some 18 km south of Saskatoon. Immediately catching my eye was a small pink gull associated with a few Ring-billed Gulls milling over a stretch of channels, backwaters and sandbars.

The visitor was studied for 15 minutes (20x scope, 7.5x binoculars). Ranging from 100 to 300 m distant, it flew back and forth over a 200 m stretch of the river. Continuously in flight, the gull wheeled, banked, towered and swooped, occasionally hovering with tail spread. Seemingly scanning the water, at times it appeared to feed from the surface. These manoeuvers yielded excellent views of the bird.

Following initial observation of the visitor, a field guide was scrutinized, turned first to Ross' Gull, then leafed through for other possible gull candidates.[12] Ross' it seemed to be, but there were several differences between bird seen and bird illustrated. Basic field marks and variances were rechecked and noted, and the unusual underwing pattern was sketched — after the pink body, it was the most prominent feature. Characteristics of winter-plumaged Franklin Bonaparte's and Sabine's gulls — ev Red-legged Kittiwake — were looked f especially the light bill, head and win but these species were dismissed as p sibilities. Because of changing light c ditions, nearby Ring-billeds we compared to ensure the pink color w not sun-glow. But I left, puzzled by obvious Ross' Gull with features differi from or not covered by the guide.

Observation Details

The bird was a small white-heade white-tailed gull with salmon-pink bo and pink underwing. Decidedly smal than a Ring-billed Gull, in size and fli it was reminiscent of Bonaparte's Gull which many were still in the district). was light, no rings, spots or two-ton (specifically rechecked), proportionat shorter than Ring-billed's. The head w white, with no trace of cap, no graying streaking on pate, no ear patch or trace neck ring, no pink wash, with dark e Breast was deep salmon-pink (a mu stronger color than a mere wash; consi erably deeper and more extensive th on spring Franklin's Gulls). Flanks we light grayed-pink, under parts pink, pla with no streaks, bars or banding. Upp parts were light blue-grey, plain. The t was white, with no pink wash, no strea bars or banding, its end rounded. U perwings were light blue-grey over m of surface. Trailing edge of the wing w white from root to beyond the car joint; the white was wide, promine Outer forewing showed black from almost to carpal joint; the line of dem cation between black area and light bl grey area was straight, at a highly ac angle with axis of wing The black pat was shaped like that on a Sabine's G

– a long, narrow triangle with its tip at ne wrist and extending to the wingtip — rough taking up less of the outer wing ian on that bird); two small unequalized "mirrors" occurred near the tip of lack primaries. Underwings were pink, xcept for the white trailing edge and lack outer forewing patch; pink on axil- ries was almost as deep as on breast, ink beyond axillaries was lighter and ayed.

iscussion

Identification was incomplete because ocket guides inherently have space only r normal field marks. The guide with me at day showed only two of the five Ross' ull plumages — the wrong two.[12] Later course to references, including a spe- alized work on gulls, provided needed ormation on plumage details, ranges in aracteristics and seldom-encountered riations.[7]

Normally in autumn, Ross' Gull under- es a complete moult out of the first mmer plumage. Moulting commences th inner primary feathers and ter- nates with the outer ones, all other thers being replaced between these events.[7] The Saskatoon bird's field rks appeared to fit this pattern of a ss' Gull moulting into adult winter mage.[8] The absence of dark tips on the er primaries implied moulting had ted, winter adults not having such tips. ntinued presence of black outer maries indicated moulting was incom- e — they formed the prominent dark ch on the outer forewing, feathers yet be replaced by their light winter nterparts.[8] Similarly, only the outer of the dark broad "W" on the upper g of first summer birds was present, inner legs (carpal bars) of the W being ent, their constituent feathers having ulted (or faded).[7] Apparently the moult ead feathers was also incomplete: the k neck ring characteristic of a first mer but not an adult winter bird was seen; yet, the dark patch, which adults show behind the eye in winter, was still to appear.

Present on the tail were neither the slight extensions of the two central feathers on Ross' in all plumages, nor the dark terminal band of the pristine first summer plumage. These protrusions are sometimes broken off or worn to points, and the black band can be faded or worn.[7] Thus, moulting of tail feathers appeared not to have started, and the condition seen was due to wear and fading. Heavy feather wear was thought to have transformed the tail from a wedge to the rounded shape observed, although this was not confirmed in the literature then at hand.

Of eight guides and references, only in Grant was it noted that a pinkish color may be present on the underwing of some birds.[7] According to him, the pink on this and certain other gulls is reported to be a colorant in the preening oil. The color intensity, which is highly variable, is thought to depend on species, age, condition, season and diet. Pink tones show better on nearby birds and under overcast — the circumstances with the Saskatoon bird. The pink seen on the breast was much deeper than shown in three field guides (Farrand, Peterson and Scott), but was of about the same intensity as Robbins depicts (assuming consistency of color in runs and editions).[4 11 13 12]

Thus, observed field marks appeared to reconcile with known characteristics of Ross' Gull — aside from the tail and excepting just the bill (without exception all the references give its color as black). Do, in fact, some first-summer birds follow the deduced moult and wear sequence, and in October exhibit the field marks observed? Available references do not address all aspects of plumage transitions, and the question was referred to the National Museum. In reply, Henri Ouellet, Curator of Ornithology, while noting points in question, concluded that there is a very high probability the bird is a Ross' Gull. His points were: pattern of black on wings (question likely due to a fault in my description, since corrected), color of legs (which I had not given), color of back, color of bill and shape of tail (pers. corr.).

A back color of light blue-gray, as observed, is not agreed by all authorities: soft blue-gray (Cramp), gray (Godfrey), pale gray (Grant) and pearl-gray (Harrison).[3 6 7 8] At this remove, clarification is impossible. Color of the bill remains an enigma.

Tail shape is crucial. In eight guides and references a wedge shape is noted as a diagnostic field mark for Ross' Gull. As remarked, no confirmation had been found for an assumption that feather wear sometimes results in a rounded end, that is, until the August, 1989, issue of *Birding* arrived in January, 1990. It had a photograph of an adult winter-plumaged (February) Ross' Gull in flight at close range.[10] And the much worn tail was rounded. A second photo, a flying adult taken close up (September), displayed less tail wear, yet enough to round off the mid-part of the tail.[9] These photos resolved the remaining critical point in an interesting identification poser. The "pink gull" was an aberrant in more ways than one: out of range, partly moulted, atypical bill color, tail uncommonly rounded and a deeper and more extensive pink coloration than usual.

Where did the gull come from? There are several small breeding colonies in the Western Hemisphere: Hudson Bay (Churchill, Manitoba), two or three islands in the Canadian Arctic, and Greenland.[2 7] The bulk of the scant population, however, breeds on the Siberian coast, from where numbers migrate eastward each autumn, biding on the Alaskan and Yukon north shore before returning to the Arctic Far East.[9 8] Ross' is thought to winter along the edge of the pack ice and in the northern seas.[8] As both breeding and wintering ranges are in the high north, this t
Arctic species is seen but rarely in
temperate zone.[7]

Ross' Gull is on the rare and
dangered species list for Cana
Godfrey did not record it for S
katchewan,[6] and neither the S
katchewan Museum of Natural Hist
(P.C. James, pers. corr.), nor the S
katchewan Bird Atlas (A.R. Sm
Canadian Wildlife Service, pers. co
has any report of it. A hypothetical e
on the Saskatoon Area bird checklist
record of mine, also of a fall visitor
1986, a bird which flew low overh
and was seen for only a few seconds.[5]
1989 sighting was a much superior
and a more challenging — observatio
a Ross' Gull, the first one written up
the province.

Acknowledgements

I am grateful to Henri Ouellet for
amining the Museums's specimen col
tion and commenting on my observa
report, and to Bernie Gollop for as
tance with references.

[1] COMMITTEE ON THE STATUS OF
DANGERED WILDLIFE IN CANA
1989. List of species with design
status. COSEWIC. 2 pp.

[2] COPLAND, H. *et al.* 1986. F
checklist of the birds of Manitoba. Mani
Avian Research Committee. 14 pp.

[3] CRAMP, S. 1983. Birds of the wes
palearctic. Oxford Univ. Press. 913 pp

[4] FARRAND, J.A. (editor) 1983.
Audubon Society master guide to bir
3 vol. Knopf, N.Y. 447, 398, 399 pp.

[5] GILLILAND, M. and J.B. GOLL
1987. Saskatoon area birds: a seas
checklist. Saskatoon Natural His
Society, Saskatoon. 8 pp.

[6] GODFREY, W.E. 1986. The bird
Canada. National Museums of Can
Ottawa. 595 pp.

GRANT, P.J. 1986. Gulls: a guide to identification. T. & A.D. Poyser, Calton, UK. 352 pp.

HARRISON, P. 1983. Seabirds: an identification guide. Houghton Mifflin. 448 p.

MAYNARD, W.R. 1989. Jewels of the orth. *Birding* 31:200-204.

O'BRIEN, R. 1989. Photograph, adult oss' Gull. *Birding* 31(4):cover.

[11] PETERSON, R.T. 1980. A field guide to the birds of eastern and central North America. Houghton Mifflin, Boston. 384 pp.

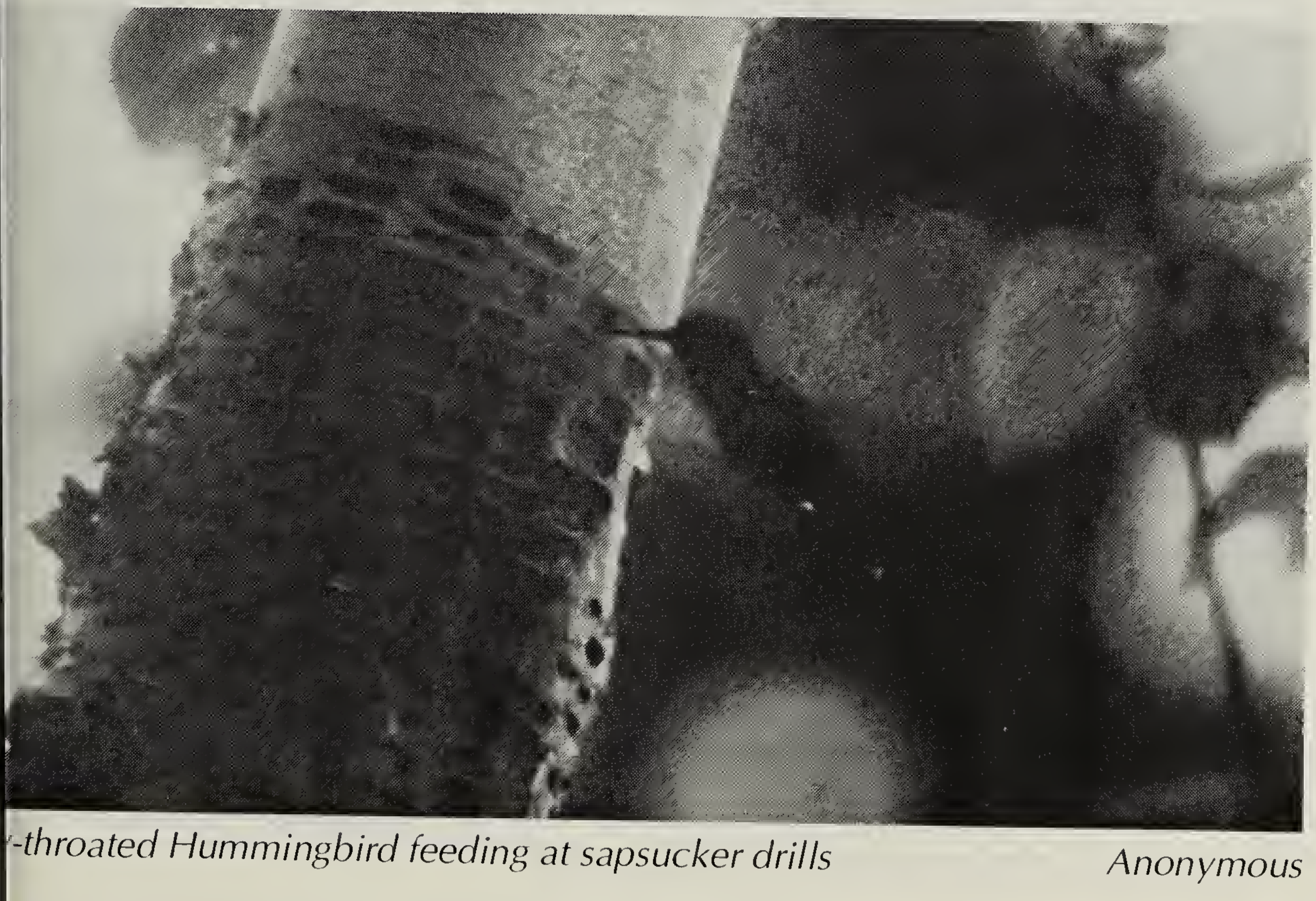
[12] ROBBINS, C.S. B. BRUUN, and H.S. ZIM 1966. A guide to field identification: birds of North America. Golden Press, New York. 340 pp.

[13] SCOTT, S.L. (editor) 1983. Field guide to the birds of North America. National Geog. Soc., Washington, D.C. 464 pp.

FORMATION REQUEST -- SAPSUCKER vs HUMMINGBIRD

ichard Miller, author of an article on sapsucker - hummingbird relationships
LLER, R.S. and R.W. NERO. 1983. Hummingbird - sapsucker associations in
thern climates. *Can. J. Zool.* 61:1540-1546.], is seeking information relative to
se two species for further analysis. He is looking for long-term migration data,
cifically spring arrival dates and fall departure dates for both sexes of Ruby-throated
mmingbirds and Yellow-bellied Sapsuckers. Send information you may have to :

Richard S. Miller
35 Linsley Road
North Branford, Connecticut, U.S.A.
06471



-throated Hummingbird feeding at sapsucker drills *Anonymous*

PREDATION AT BANK SWALLOW COLONIES NEAR KATEPWA LAKE

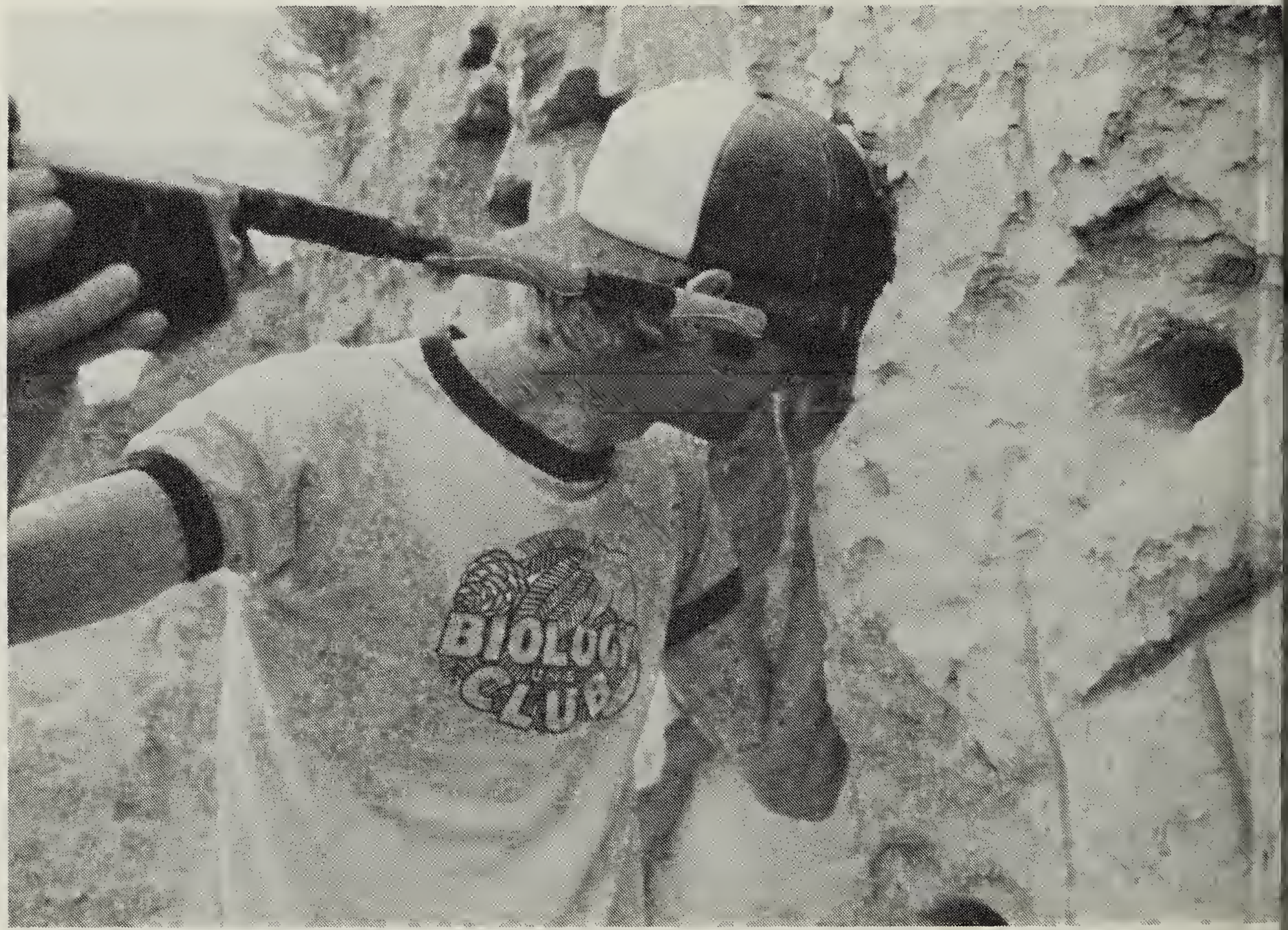
DALE G.HJERTAAS and PAULE HJERTAAS, 15 Olson Place, Regina, Saskatchev
S4S 2J6

During 1980 and 1981, we studied Bank Swallow colonies along the Qu'-Appelle Valley in the area of Katepwa Lake for the senior author's M. Sc. research.[4] Several cases of predation observed at these Bank Swallow colonies are reported here.

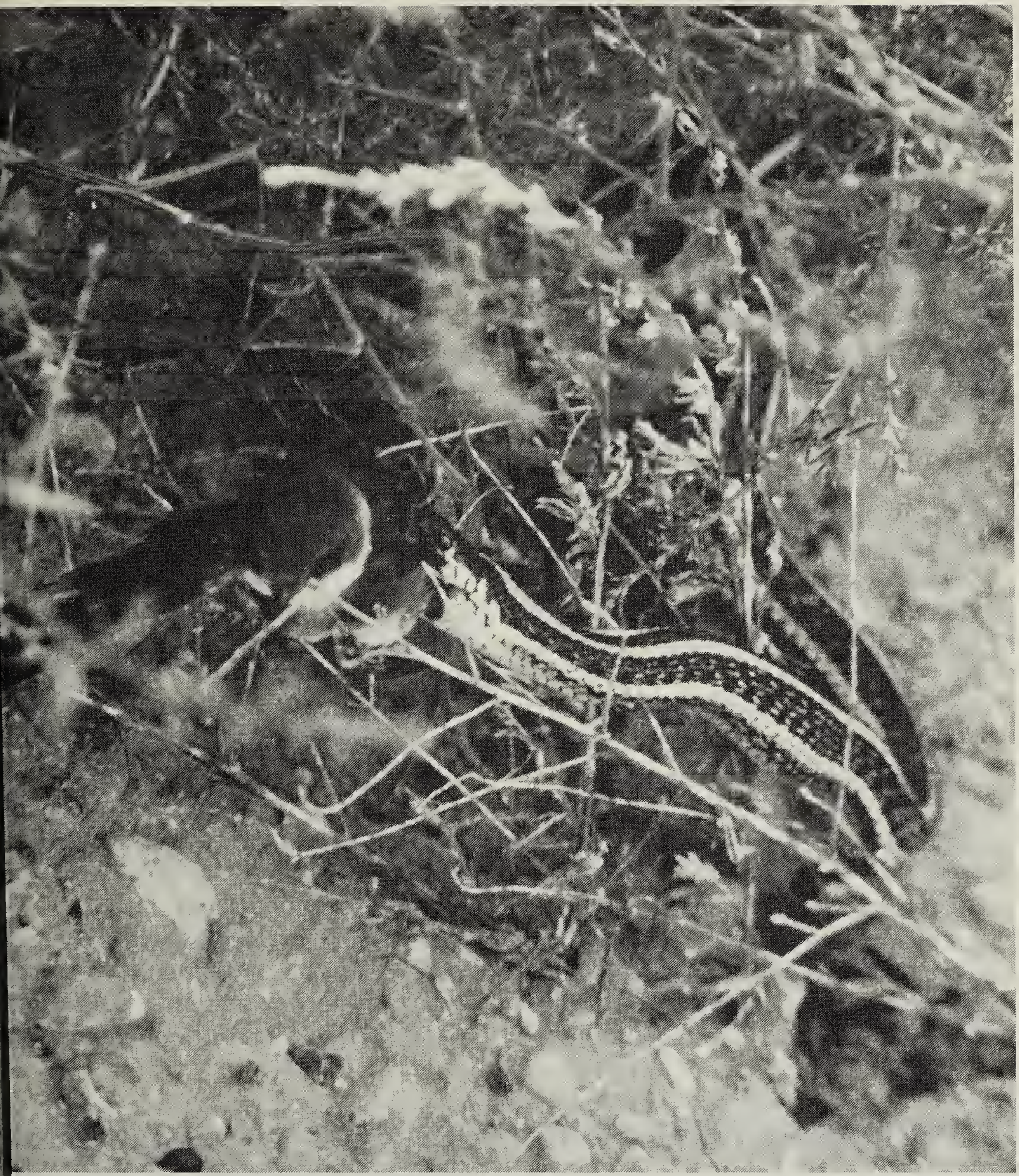
We made repeat observations at 498 nests and recorded 183 known nest failures during 1980 and 1981. Only 9 of these failures were directly attributable to predation. Additional cases of predation were recorded in 1982 in the same area.

The most exciting predator-prey interaction observed was on 13 July 1980, at approximately 6:30 p.m. While driving through Lebret Dale glanced at a B
Swallow colony at the edge of town.
saw a Bank Swallow fluttering in fro
its hole, his impression was that it
struggling as though caught with a st
around its foot. Thinking the bird
have become entangled in an unusu
long piece of nesting material, we tur
the car around at the next intersec
and drove back to the colony. At firs
saw nothing and almost concluded
bird was gone when we noticed a g
snake holding a struggling Bank Swa
at the bank base.

The snake was in and around s
Russian Thistle on the talus slope b
the nest holes. It held the swallow



Dale Hjertaas inspecting Bank Swallow burrow



tern Plains Garter Snake with Bank Swallow

nd the wing and appeared to be g to slowly shift its grip until it could ow the bird from the front or back. process was hampered by the ow's struggles and by the wings. The Swallow, which appeared to be an , rested quietly some of the time, would struggle, flapping its wings fting the snake's head several inches e ground.

en we returned between 8:00 and p.m. they were at the same place. The snake had shifted its grip and was trying to swallow the bird tail first, having engulfed it up to the wings.

This case of predation did not cause a nest failure as young were already flying from all nests at the colony, although a few Bank Swallows were still returning to nest tunnels.

The ten nest holes at this colony were from 1.3 to 1.75 m above the talus slope and between 0.75 and 1.5 m from the bank top. We did not attempt to estimate the length of the Western Plains Garter Snake, but believe it was able to reach nest holes from the bank top. We do not know whether it trapped a swallow which was already inside the tunnel, or waited in ambush for a returning swallow. When we drove by, the snake must have just caught the swallow and was struggling with it in the tunnel entrance. Freer observed a Black Snake enter a burrow from the top of the bank and visit three tunnels before taking a young swallow.[2] Black Rat Snakes have also been noted as predators at Bank Swallow colonies.[1 6] Mobbing by the Bank Swallows was an ineffectual defence against these snakes.[1 2] Steepness of the bank and an overhang at the bank top may prevent snakes from reaching the burrows.[1 2]

In 1981 a Deer Mouse nested in an old swallow tunnel in a gravel stock pile south of Lebret. Small ledges on the gravel face allowed the mouse to travel back and forth along the bank face and reach other swallow holes. The mouse appeared to eat the swallows' eggs as we observed bits of broken egg shells in failed swallow nests. Nine of the 16 nests at this colony failed due to the mouse eating eggs. Four other nests failed for reasons which remain unknown because we could not see into the nest chamber. The Deer Mouse may have been involved in these nest failures as well. The only nest of 16 which fledged young at this colony was the farthest nest from the hole occupied by the deer mouse.

Stoner reported a Deer Mouse in a Bank Swallow colony but could see no evidence of the mouse having damaged eggs or young.[7] These mice have been reported as a major predator of Spotted Sandpiper eggs.[5]

Bank Swallows have been reported to mob mammalian predators such as chipmunks which sometimes prey on nestlings or eggs.[2 3] We never observed the
Bank Swallows along the Qu'App
Valley use such mobbing tactics. On
June 1980 we watched both a Least C
munk and a Thirteen-lined Ground Sq
rel at a colony. Both moved on the t
slope and on ledges on the actual
bank without any interference by
swallows. The chipmunk actually loo
into some of the burrows. Although
Bank Swallows took no action, a Ho
Wren which was nesting in an u
cupied Bank Swallow tunnel attac
and chased the chipmunk from the b
face.

During 1980 and 1981 we observe
evidence of predation by large mam
which we had thought would be a m
factor influencing where Bank Swall
nested. However in 1982, 28 of 30 n
at one gravel pit complex and 1 of 8
second pit, approximately 2 km a
were dug out by a mammal which
cavated down to the nest chamber f
above. Perhaps it could hear or smel
nestlings or adults as holes were
cavated directly to the chamber and
contents scooped out through a s
opening. Bits of egg shell at some
suggested they were still at egg st
while others clearly contained y
when preyed upon between 11 an
July.

Holes dug by mammalian predators

The species of predator could not be ntified with certainty as recent rains d eliminated tracks before each of our its. However, size of the holes (they re 15 to 18 cm wide at the top, and nnel shaped with only a small opening the nest chamber), and some scats ggested a larger mammal such as a unk, fox or badger was the predator. ner reported a Striped Skunk digging wn to as many as five nests over a ight period.[7] Nests lower than 60 cm re usually safe from this skunk. Freer erved a colony of 30 nests entirely troyed by a mammal digging down m above.[2]

nterestingly, at the colony where only e nest was excavated, it was the one sest to the surface. Tunnel entrances of ts preyed on by this mammal ranged m 11 to 42 cm below the bank top. The tance from the ground surface to the t chamber was not recorded.

redation at Bank Swallow colonies in Qu'Appelle Valley was a minor rce of nest failure in 1980 and 1981. wever, as shown by the almost total ure of one colony in 1982, predation have a significant impact in some es and is undoubtedly a strong selective force in determining the types of banks selected by Bank Swallows.

1 BLEM, C.R. 1979. Predation of Black Rat Snakes on a Bank Swallow colony. *Wilson Bull.* 91:135-37.

2 FREER, V.M. 1977. Colon structure and function in the Bank Swallow *Riparia riparia* L. Ph. D. dissertation, State Univ. New York, Binghampton, N.Y.

3 GINEVAN, M.E. 1971. Chipmunk predation on Bank Swallows. *Wilson Bull.* 83:102.

4 HJERTAAS, D.G. 1984. Colony site selection in Bank Swallows. M. Sc. Thesis, Univ. of Sask., Saskatoon, Sask.

5 ORING, L.W., D.B. LANK and S.J. MAXSON. 1983. Population studies of the polyandrous Spotted Sandpiper. *Auk* 100:272-285.

6 PLUMMER, M.V. 1977. Predation by Black Rat Snakes in Bank Swallow colonies. *Southwest Naturalist* 22:147-148.

7 STONER, D. 1936. Studies on the Bank Swallow *Riparia riparia* (Linnaeus) in the Oneida Lake Region. *Roosevelt Wildl. Annals* 4:127-233.

k Swallow feeding young at burrow entrance

MOCKINGBIRD NEAR SYLVAN LAKE, ALBERTA

On 19 March 1990 I heard a bird singing many beautiful but different songs. I tried to walk closer, but the crusty snow made a big noise and I could not get near the bird without scaring it away.

Three days later a neighbor lady asked me if I could identify a bird she had seen lately. She described it as being grey, with a long tail and black markings on its wings when it flew. She said it sang beautifully and seemed to be singing other bird songs also. I thought to myself this bird must be a mockingbird, so I looked it up in my *Field guide to birds of North America*. Still I wasn't sure if it was a mockingbird because it is a bird of the southern half of the U.S.A.

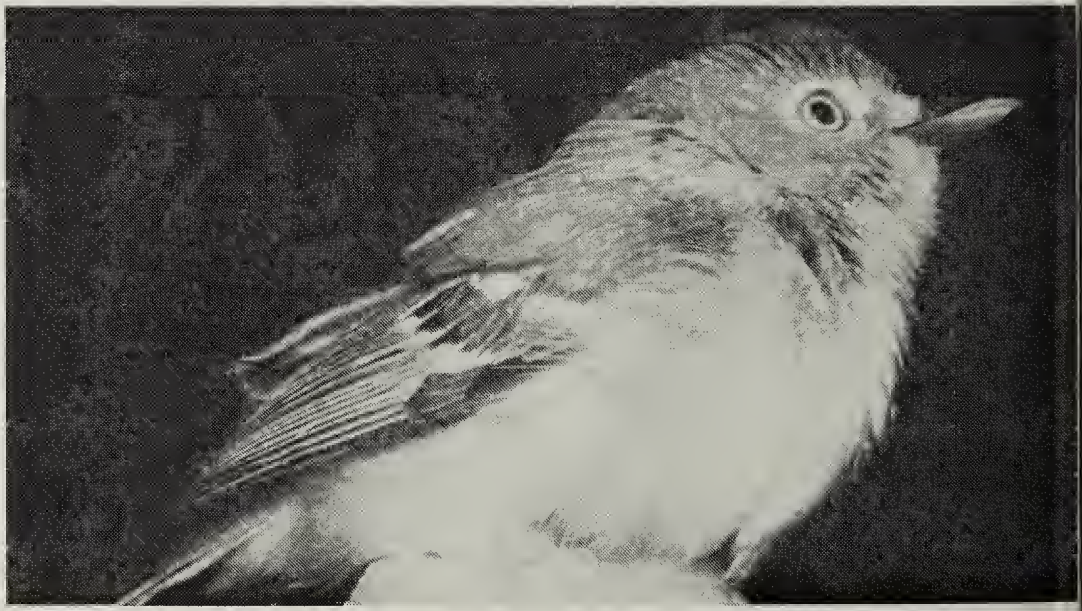
On 28 March the bird was back on a tall aspen poplar. I had a good look at it through my field glasses. It wagged its from side to side while perched on branch. The tail seemed almost to be length of its body. When it flew, its w beats were so slow that they could counted and it showed white w patches. It somewhat resembled a shr but was lacking the hooked bill; also shrike's bill is short and thick. The r evening I heard the bird singing mus notes and saw it in flight.

This is the first sighting of the North Mockingbird in this area for me, thou have lived here 68 years. The descript in my field guide gave the same vers as I observed when I studied the b through my field glasses. — *Helg Abrahamson*, Box 268, Sylvan La Alberta. T0M 1Z0

FURTHER TO WHITE-EYED VIREO OBSERVATIONS

While reading the December 1989 issue of Blue Jay, the article "White-eyed Vireo in Regina — first for Saskatchewan" by Frank H. Brazier [Blue Jay 47(4):216] caught my eye. He mentioned a white-eye banded in South Dakota on 20 May 1982. I knew that my parents, Charles and Gladyce Rogge (Permit #9089), had banded this species, so I checked with them and found that they had indeed banded a White-eyed Vireo in Newton Hills State Park, South Dakota on that date. T photographed the bird, a rare record South Dakota, at the time of banding

— *Janet Rogge Dugle*, Box 299, Pin Manitoba. R0E 1L0



White-eyed Vireo, Newton Hills State Park, South Dakota, 20 M 1982
Charles and Gladyce Ro

OUSE FINCH AT REGINA, SASKATCHEWAN

he following notes were taken on
use Finch observations in Regina,
katchewan.

ate: 23 April 1990

lace: Back yard feeder, 40 Richardson
scent, Regina, Saskatchewan

me: 10:30 a.m.

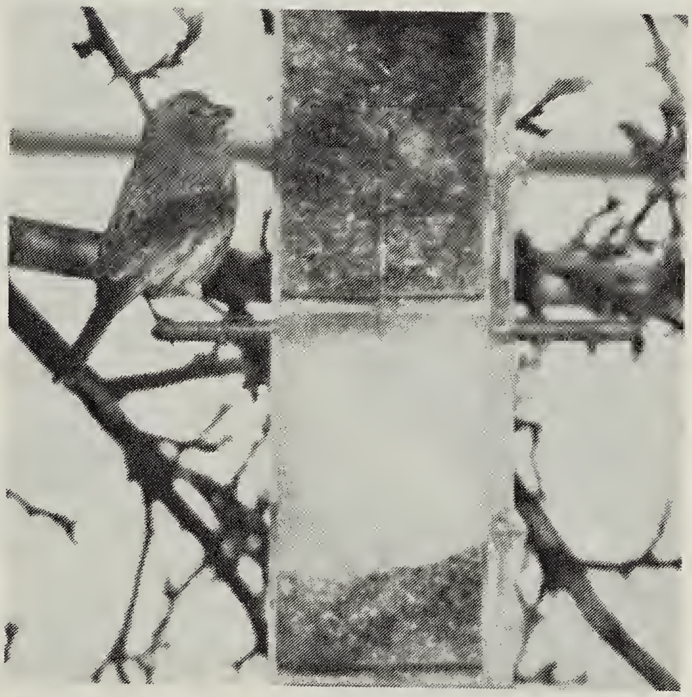
escription: Small bird, size of spar-
, slightly slimmer, brownish in color,
ked breast. No markings on head.
k bill.

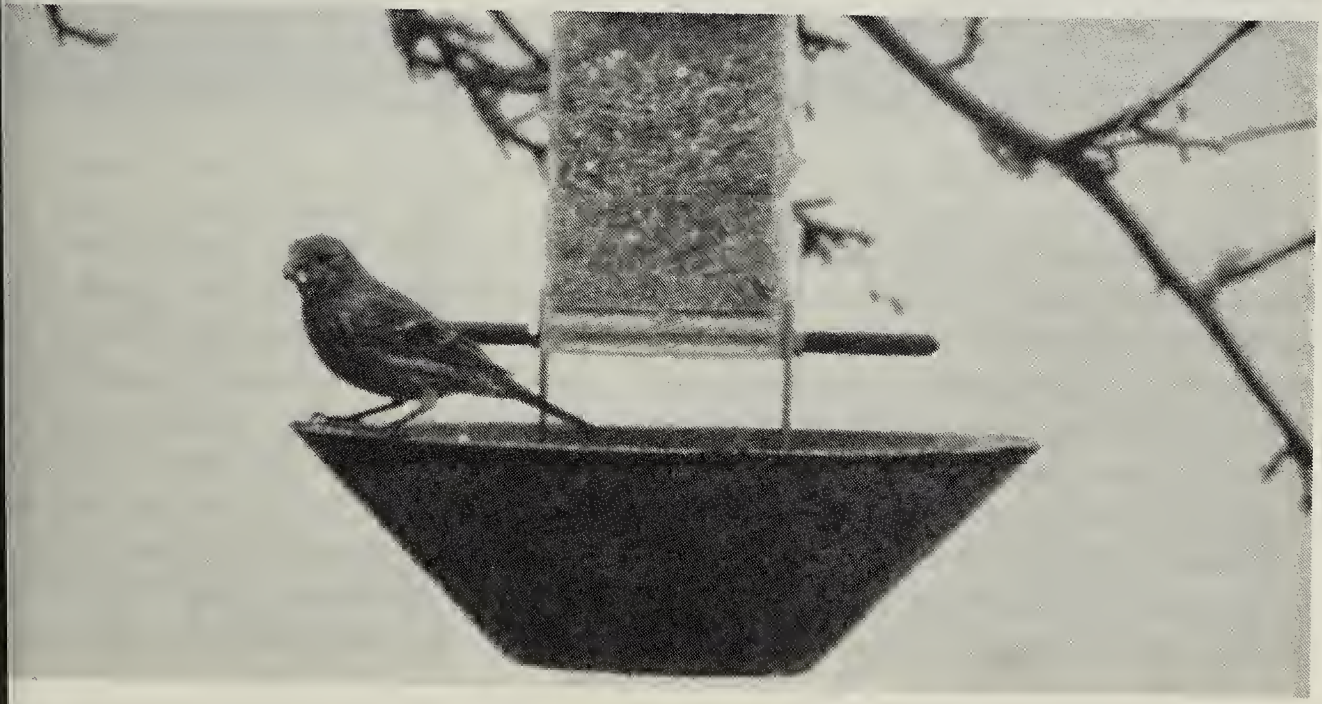
eding habits: Fed on sunflower seeds
er than bird seed. Never seen on
nd. Always at feeder or in tree, not
idated by sparrows.

htings: 23 April 1990, 10:30 a.m.,
- 5:30 p.m. 24 April 1990, 7:30 a.m.
seen again.

otos (slides): Ektachrome 200 lens
n 70-230. Photo taken at 230 at a
nce of about 12 feet.

Keith Barr, 40 Richardson Crescent,
a, Saskatchewan. S4S 4J3





IN MEMORIAM — DR. FREDERICK GEORGE BARD — 1908 - 1989

RUBY APPERLEY and FRED LAHRMAN

Fred Bard worked at the Saskatchewan Museum of Natural History in Regina for a total of 45 years — years which were dedicated to the task of building and maintaining the Museum.In spite of terrific odds and great difficulties and discouragement, and because of this unfaltering determination, a permanent facility was finally constructed and completed in 1955.

Supported by the Saskatchewan C en Jubilee Committee and the katchewan and Regina Natural Hi Societies, the building of the museum was the culmination of Bard's dream. At that time, this renov building with its lifelike and detailec plays was considered to be one of a in north America — a graphic testir to Fred Bard's imagination and ener

ears later Dr. Stuart Houston com-
nted in his wildlife column in the
rterly Fish and Game Sportsman: "I
ember Fred showing me through the
v building on Easter Weekend 1955.
plastering wasn't done, wires
gled and exhibits were just holes in
wall. Familiar with habitat exhibits in
e American museums, where one
takes over one year and $10,000.00
repare, I expected that at most one
itat case would be ready when the
ernor General opened the museum
May 16. Imagine my surprise at the
ning ceremonies to find the Museum
npleted. Ably assisted by Fred
rman and R. D. Symons and by work-
night and day these men had
eved the impossible."

m his early youth Fred Bard loved
utdoors and the world of nature. He
ted to share with others the wonders
und there. When he was 16, the
eum of Natural History became a
ral outlet for him to achieve his goal
pularizing nature. Perhaps it is not
rally known that he also dreamed of
useum out-of-doors, one where
le could enjoy and study the living
l of nature in the wild. To this end,
as instrumental in establishing the
ana Waterfowl Park, the Condie Na-
Refuge, as well as many Interpretive
res and Nature Trails within the
ncial parks system.

o can ever know the countless
of pleasure, the thrill of discovery,
w many lives have been touched by
le visiting these sanctuaries.

ny of Bard's happiest hours were
with his family on a small, open,
ss piece of property fronting on the
ana Creek in Regina, which he had
ased in the late thirties. It didn't
n barren for long. He soon planted
upon row of trees which grew
usly. He excavated a dugout and
had his own private sanctuary. He
called this area the "banding station" — for it was there that he first banded waterfowl and began his prestigious bird banding career. Thus over the years Fred Bard won recognition in North America as an ornithologist.

Bard delighted in listening to the songs of the Yellow-headed Blackbirds, Marsh Wrens and other birds which filled the air with their melodies in early spring and summer while he worked in his garden at the "banding station." It was here that the Wascana Canada goose flock was started. The flock began modestly in 1953 with the first pair of geese — "Hiawatha and Queenie" — a gift from the late Ralph Stueck, a naturalist from Abernethy, Saskatchewan. It took additional pairs of geese, eggs, hard work and a good measure of trial and error before the geese became established. The many Canada Geese now found in the southern part of the province and especially Regina, attest to the success of this pilot project.

At the "banding station" Fred Bard did some of his first film work. He spent many hours in blinds photographing birds in the marsh, becoming an accomplished photographer — both in stills and motion pictures. His beautiful photos appeared in various publications throughout Canada and the United States. He assembled a portfolio of coloured slides to meet the demand for his lectures, which he delivered to many city and rural schools in the province.

While Fred's photography portrayed the beauty of nature, the theme always centered on conservation and the preservation of natural habitat. His film *The Pelicans of Last Mountain* won an award of excellence at the Yorkton Film Festival in the early 1950s. He filmed a variety of subjects including the Carrot River Log Drive, paleontology and archaeology excavations and of course his first love, zoology. Much of this footage was incorporated into other film productions.

Early in his career Fred became involved with the conservation of the nearly extinct Whooping Crane. In the mid 1940s he assisted others in the search for the then unknown nesting area of these magnificent birds. Although many miles were flown over northern Saskatchewan, no nests were found. It was not until about 1945 that he saw his first Whooping Crane. There is a tale of his delight and amazement when he saw the almost mythical bird and shouted "It really is a Whooping Crane."

Through publicity campaigns, the public rallied in support of the birds and reports began coming in of other Whooping Crane sightings. It was through these reports that Fred and other museum staff were able to film the cranes, and no doubt this publicity helped to bring the Whooping Crane back from the brink of extinction. It was Fred who first conceived of the idea for a Whooping Crane foster parent experiment using Sandhill Cranes to raise Whooper chicks. Some 20 years later, in 1975, the experiment was finally tested.

Fred Bradshaw, Director of the Provincial Museum since 1928, and his staff at the museum were undoubtedly the catalysts in the move to organize the Regina Natural History Society founded in 1933; many of the preliminary discussions took place in the work room of Bradshaw's assistant, Fred Bard. The Regina Society and the Provincial Museum have remained mutually supportive.

When Fred was appointed director of the Provincial Museum in 1947 he promised to assist the *Blue Jay*, which was in difficulties after Isabel Priestly's death, by mimeographing the bulletin at the museum. He also reported regularly to the *Blue Jay* on museum activities. When an organization meeting was called in Regina to form the Saskatchewan Natural History Society on 24 January 1949, Fred Bard was one of the founding memb He was one of it first directors (altho he preferred not to take an office), honorary president for some time. In early years, Bard was an active mem of both the provincial and local societ

Fred Bard was a founding board m ber of the Saskatchewan Museums sociation and continued his supp throughout the years, always willin assist the smaller museums of province.

On 31 May 1970, Fred retired from Saskatchewan Museum of Natural tory, where he had served so diligentl 45 years, the last 23 as director. Just to his retirement he was awarded honorary Doctor of Laws degree by University of Saskatchewan, Re Campus, in recognition of his not contributions to the province in devel ing the Museum and for his work in c servation. In addition, he recei numerous other awards for his dedic services to conservation.

After his retirement from the Muse Fred and Phyl Bard moved to Surrey, where nature conservation and promotion of natural history continue play an important role in Fred's life. spent many hours working on a l Ducks Unlimited project, where he the opportunity of working with beloved Canada Geese.

On 23 September 1989, at the ag 81, Frederick George Bard passed a after a lengthy battle with cancer. H survived by his wife of 53 ye Philomene, of Surrey, B.C., one Donald of California, twin daughters lene Feltz of New Mexico and Lor Freemen of Victoria, B.C.

Fred Bard's contribution to wil conservation and education will c tinue to enhance the lives of people generations to come.

SASKATCHEWAN NATURAL HISTORY SOCIETY
BOX 4348, REGINA, SASKATCHEWAN S4P 3W6
(306) 780-9273

BLUE JAY BOOKSHOP
SUB P.O. 8, 1210 7th AVENUE N,
SASKATOON, SASKATCHEWAN S7K 2W2

ARD OF DIRECTORS

FICERS

norary President	Frank Brazier	2657 Cameron St., Regina	S4T 2W5
sident	Lloyd Saul	#4, 2614 Dufferin Ave., Saskatoon	S7J 1C9
t President	Lorne Rowell	Box 639, Fort Qu'Appelle	S0G 1S0
st Vice-President	Frank Switzer	1301 Shannon Road, Regina	S4S 5K9
cond Vice-President	Sheina Wait	1008 Gray Ave., Moose Jaw	S6H 1N3
asurer	Bob Ewart	2818 Sinton Ave., Regina	S4S 1K3
retary (Corr./Rec.)	Phyliss Bordass	Box 313, Ft. Qu'Appelle	S0G 1S0

POINTED DIRECTORS

e Jay Bookshop	Don McRobbie	705 - 9th Ave. N, Saskatoon	S7K 2Y8
e Jay Editor	Sheila Lamont	Box 550, Raymore	S0A 3J0
e Jay News	Bob Kohlmeier	708 - 9th Ave. N, Saskatoon	S7K 2Y9
F Representative	Mary Gilliland	902 University Dr., Saskatoon	S7N 0K1
nservation	Jim Elliott	2258 Rae St., Regina	S4T 2E9
ance Chairman	Jim Slimmon	2526 Hanover Ave., Saskatoon	S7J 1G1
cial Publications	Mary Gilliland	902 University Dr., Saskatoon	S7N 0K1
mbership	Carol Bjorklund	3634 McCallum Ave., Regina	S4S 0S5
mbers Initiatives	Merv Hey	104 Dunlop St., Saskatoon	S7N 2B5
r Director	Stanley Shadick	3F - 1800 Main St., Saskatoon	S7H 4B3

RESENTATIVES AT LARGE

ol Bjorklund	3634 McCallum Ave., Regina	S4S 0S5
ce Christianson	Box 1005, Nipawin	S0E 1E0
Driver	22 Red River Road, Saskatoon	S7K 1G3
Finley	Box 36, Luseland	S0L 2A0
hard Gollop	2202 York Ave., Saskatoon	S7J 1J1
ny Greif	Box 1933, Prince Albert	S6V 6J9
yne Harris	Box 414, Raymore	S0A 3J0
ly Harstad	Box 1878, Nipawin	S0E 1E0
ce Irvine	85 - 3rd Ave. N, Yorkton	S3N 1C2
James	2350 Garnet St., Regina	S4T 3A2
rew Whiting	925 University Dr., Saskatoon	S7N 0J9
hael Williams	1006 - 606 Victoria Ave., Saskatoon	S7N 0Z1

IONAL DIRECTORS

Belanger	412 McGillvary Dr., Weyburn	S4H 1M1
Cruise	1204 Hochelaga W., Moose Jaw	S6H 2J4
ald Hooper	Box 40, Somme	S0E 1N0
e Lepp	11 Dogwood Cres., Yorkton	S3N 2M6
the McMaster	306 Brock St., Winnipeg	R3N 0Y9
stine Pike	Box 117, Waseca	S0M 3A0

SIDENTS OF LOCAL SOCIETIES

Qu'Appelle	Ronald Hooper	Box 757	S0G 1S0
n Head	Vic Beaulieu	Box 1213	S0G 2K0
ort	Phil Curry	Box 1115	S0E 1A0
se Jaw	Ed Walker	1701 Laurier St.	S6H 2W6
e Albert	Carman Dodge	Box 1933	S6V 6J9
na	Phyllis Ilsley	Suite # 5 - 2345 Rae St.	S4T 2G3
atoon	Pat Adams	Sub P.O. #6, Box 448	S7N 0W0
burn	Dick Gutfriend	Box 411	S4H 2K3
ton	Warren Hjertaas	510 Circlebrooke Dr.	S3N 2Y3
UTIVE DIRECTOR	Suzanne Henry	2201 Dufferin Rd., Regina	S4S 5B5

R

William Sarjeant
967 University Dr.
SASKATOON, SK S7N 0J2
EXPIRY DATE 12/31/90

unclaimed
253

NOV 23 1990

RETOUR À
RETURN TO

SASKATCHEWAN NATURAL HISTORY SOCIETY

Second Class mail registration Number 1046
Please return unclaimed copies.
Return postage guaranteed.

Box 4348, Regina, Saskatchewan.
S4P 3W6